

COMPUTERWORLD

IBM network group loosens host shackles

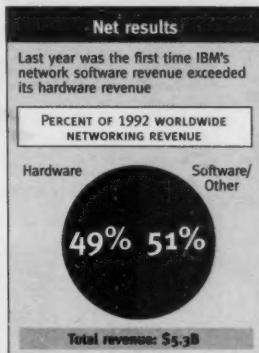
Incentives spur dedicated sales force

By Elisabeth Horwitt
ARMONK, N.Y.

■ After winning semiautonomy from its corporate parent one year ago, IBM's Network Systems Group is moving products to market faster and is attacking promising new niches.

However, general manager Ellen Hancock and her team still have a way to go before they are perceived as a viable multivendor networking player, users and consultants said.

Late in 1991, a major IBM restructuring gave Hancock's unit more freedom to pursue its own research and development and marketing objectives without having to report every move to the corporate bureaucracy. "The reorganization helped us go from host- to network-centric," she said.



Source: IBM

A year ago, Hancock took decentralization a step further by turning her line of business into a holding company in its own right, overseeing seven product-specific

IBM, page 12

Client/server migration

Hotel cans mainframes

By Lynda Radosevich
PHOENIX

■ Travelers who called the 800 number for Choice Hotels International over Valentine's Day weekend were told their reservation could not be confirmed using that number because the national system was down. The customers then had to call their hotels directly and incur long-distance charges.

The inconvenience was not caused by a catastrophic system failure. It was a planned part of the hotel conglomerate's move to a client/server reservation system, said Jim Yoakum, senior vice president at the

chain's reservation and information systems technology center.

"As of this weekend, the two Amdahl mainframes will be gone," he said. Choice Hotels operates 2,889 hotels, including the Quality Inn and Econo

Lodge chains.

Two years ago, the company began moving its reservation databases from mainframes to database servers. Individual hotels generally have local-area networks that use leased lines to access real-time room availability information.

"It is a major shift to client/server, and the amazing thing is, it's working," Yoakum said.

Choice Hotels' new system comprises symmetrical multi-

Hotel, page 16

SQL Server to get 32-bit upgrades

By Jean S. Bozman
REDMOND, WASH.

Just as the Microsoft Corp./Sybase, Inc. 16-bit SQL Server for OS/2 is running out of steam at user sites, up pop two 32-bit options said to at least double the database's performance. Some database applications could see as much as an eightfold boost in performance, beta-testers claimed.

Microsoft said last week that it is readying migration packages that will move users to a Windows NT-based, 32-bit SQL Server database engine in the third quarter. At the same time, Microsoft's technology partner Sybase, which developed the SQL Server database engine, said it is readying a 32-bit OS/2 product for delivery in 1994.

Shipment of Microsoft SQL Server for NT — jointly developed by Microsoft and Sybase but marketed solely by Microsoft — is expected to follow NT's shipment by 90 days, said Gary Voth, Microsoft's product manager for SQL Server. Microsoft, however, has not committed

to field or sell a 32-bit OS/2 version.

It is hardly surprising that many users of SQL Server for OS/2 would welcome the new 32-bit options to the 4-year-old SQL Server product. SQL Server for OS/2 is limited to 16M bytes of main memory, and response time on heavily used PC local-area networks is often inadequate, longtime users reported.

Database sequel

Key features of SQL Server for Windows NT:

- The ability to double-boot SQL Server for OS/2 and SQL Server for NT on the same machine.
- An upper limit of 2G bytes of main memory.
- A new SQL Object Manager facility that allows database administrators to create database tables and views of those tables more easily.
- A new SQL Administrator menu-driven console panel that guides users through the process of granting security privileges while tracking I/O bottlenecks and monitoring system performance.

Source: Microsoft Corp.

CW Chart: Michael Higgins

same time," said Mohsen Moazami, president of Stanford Business Systems, Inc., a Culver City, Calif., integrator that builds SQL Servers for Fortune 500 users.

By simply moving to a 32-bit architecture, users will find that their SQL Server database engines perform much faster and will support

SQL Server, page 20

Michelangelo virus

Security a tough sell

By James Daly

A year after the Michelangelo virus scare had the business community on the verge of hysteria, information security managers say the hype has helped raise awareness about the need for data safety. However, the job of selling security to management and end users remains difficult.

"Despite all the screaming during the Michelangelo scare, computer security is still a difficult point to get across," said Jack Skalon, a network specialist at the University Hospital Consortium in Oak Brook, Ill.

"The only good thing that came out of all the Michelangelo hype was that it got people shaken up.



The Michelangelo virus was first reported in April 1991 in Sweden and the Netherlands. It is set to go off every March 6, the birthday of the Renaissance painter and sculptor.

People need to be shaken up. They need to know security is not a joke," Skalon said.

The trouble was that in the end, Michelangelo seemed like an elaborate hoax because its impact was minimal. Michelangelo became a cause celebre for the vulnerability of our computerized society, however, when several hardware and software companies unknowingly shipped products infected with the rogue code.

The virus achieved its astonishing notoriety when heretofore reliable security experts such as John McAfee, namesake of the antivirus software maker, predicted that it could irretrievably alter data on "anywhere from 50,000 to 5 million

Viral threat, page 24

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Delta CEO Ron Compton's
team in its hands steady as
the company tries to steer
itself into calmer waters.

NEWS

PC software wars heat up. Microsoft has launched a training program for NT developers targeting IS, but customers are being coy. *Page 4*. On the product front, C++ compilers from both Microsoft and Borland will be shown at Software Development '93 next week. *Pages 20, 61*. And while CA gears up to make a run at Windows and OS/2 desktop applications, Lotus tries to spark interest in Inpro with an introductory price of \$99. *Page 14*

IS is also struggling with desktop software issues. Balancing flexibility with consistency is among the concerns of IS managers who have to set standardization policies for PC software. *Page 39*. Chevron turns to a systems integrator to get the advantages of volume purchasing without the restrictions. *Page 14*

IBM fired the latest volley in its recent product barrage, unleashing 14 new AS/400 models. *Page 12*. IBM's networking chief, Ellen Hancock, takes time out to update *Computerworld* readers on her unit's activities. *Page 1*

RDBMS

While Microsoft and Sybase develop an NT-based 32-bit SQL Server, Sybase is building on its own a 32-bit upgrade to the OS/2-based SQL Server. *Page 1*. Early users of Oracle's new tool set, due next month, say the beta-test code is stable but needs fine-tuning. Oracle, meanwhile, is gearing up to move into the groupware arena, with plans to face off against Lotus' Notes. *Page 8*

THE CW GUIDE

Beta-test users of Microsoft's Windows NT say the desktop operating system meets their expectations, but they voice other concerns, such as performance, vague pricing and NetWare compatibility. *Page 69*



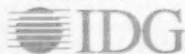
Technical Sections

APPLICATION DEVELOPMENT	61
DESKTOP COMPUTING	39
ENTERPRISE NETWORKING	51
LARGE SYSTEMS	57
WORKGROUP COMPUTING	47

Departments

CALNDAR	67
COMPANY INDEX	99
COMPUTER CAREERS	85
COMPUTER INDUSTRY	101
CW GUIDE	69
EDITORIAL/VIEWPOINT	32, 33
FRIDAY STOCK TICKER	100
IN DEPTH	81
MANAGEMENT	65
MARKETPLACE	93

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News

AMR seeks wider horizons

Expansion of IS services to be built on Sabre's success

By Mitch Betts
FORT WORTH, TEXAS

■ AMR Corp., painfully aware of the irony that its Sabre reservation system is profitable and its core airline business is not, is forging ahead with plans to diversify into the computer services business.

While AMR is planning to dump unprofitable flights and airline operations at American Airlines, for example, it has just entered the network outsourcing business and has a contract with Canadian Airlines to provide computer and accounting services worth \$2 billion over two years.

AMR's interest in diversification has picked up as "the airline situation has gotten worse," said Max Hopper, AMR's senior vice president of information systems. American Airlines has lost \$1.22 billion since 1990.

"We are constantly looking for new niches" in the computer services business, including modest acquisitions, Hopper said. Besides trying to become an IS "supermarket" for the travel industry, AMR may someday offer transaction processing services to the health care and retail industries, he said.

Hopper said AMR considered a foray into transaction processing for the financial services industry, but he said that market "has far too many competitors, so we decided to opt out and watch."

Robert L. Crandall, AMR's chairman and chief executive officer, has long recognized the

Sabre network as a money-making machine and apparently wants to exploit that strength. "If you told me I had to sell either the airline or the system, I'd probably sell the airline," Crandall told a Society for Information Management audience in 1991.

One vehicle for AMR's expansion strategy is the new network outsourcing business. Earlier this month, AMR Information Services, Inc. launched the AMRnet Network Services Division, which will sell space on the company's own data network, as well as network design and consulting services.

In addition, the IS subsidiary has developed Sabre-like reservation systems for the new French high-speed railway and more than 50 airlines worldwide. In other experiments, AMR has a joint venture with CSX Corp. to market the Encompass freight-tracking system [CW, April 20, 1992] and has its data entry clerks in Barbados taking on work for insurance companies.

AMR's image as a technology powerhouse has been tarnished, however. Its joint venture to build the Confirm reservation system for hotels and rental-car companies was a fiasco that led to lawsuits and a \$165 million write-off [CW, Oct. 12, 1992].

Analysts said the transportation company's diversification into the already crowded field of computer services makes sense, but success is far from guaranteed.

"It can be done, but it will take persistence and deep pockets," said Jeff Bruckner, managing director at DMW Group, Inc., an IS consultancy in Stamford, Conn.

Flight of fancy?

AMR hopes its growing information services business will help it regain profitability

1992	
Revenue	\$14.4B
Net loss	\$(935M)
Estimated 1992 figures	
IS spending	\$1,091M
Percent of IS spending spent on IS staff	27.6%
Total IS staff	6,096

Source: Computerworld Premier 100

Change in plans

DOS 6.0 upgrade cuts features

By Cara A. Cunningham
REDMOND, WASH.

Microsoft Corp. has removed networking features from its DOS 6.0 upgrade, which may be shipped without portions of its built-in data compression utility, according to a letter accompanying the latest beta-test copy.

Microsoft pulled networking and electronic-mail capabilities from DOS 6.0, which is expected to ship in April, because those features cause confusion for users who already have networks, according to Microsoft's letter.

Networking features included in earlier beta-test versions of DOS 6.0 allowed DOS machines to share resources and exchange E-mail with PCs on networks running Windows for Workgroups, LAN Manager and Windows NT. Microsoft recently released Workgroup Connection, a DOS add-on that provides similar capabilities for DOS users connected to networks running Windows for Workgroups, the letter noted.

The company also removed MaxCompress, a

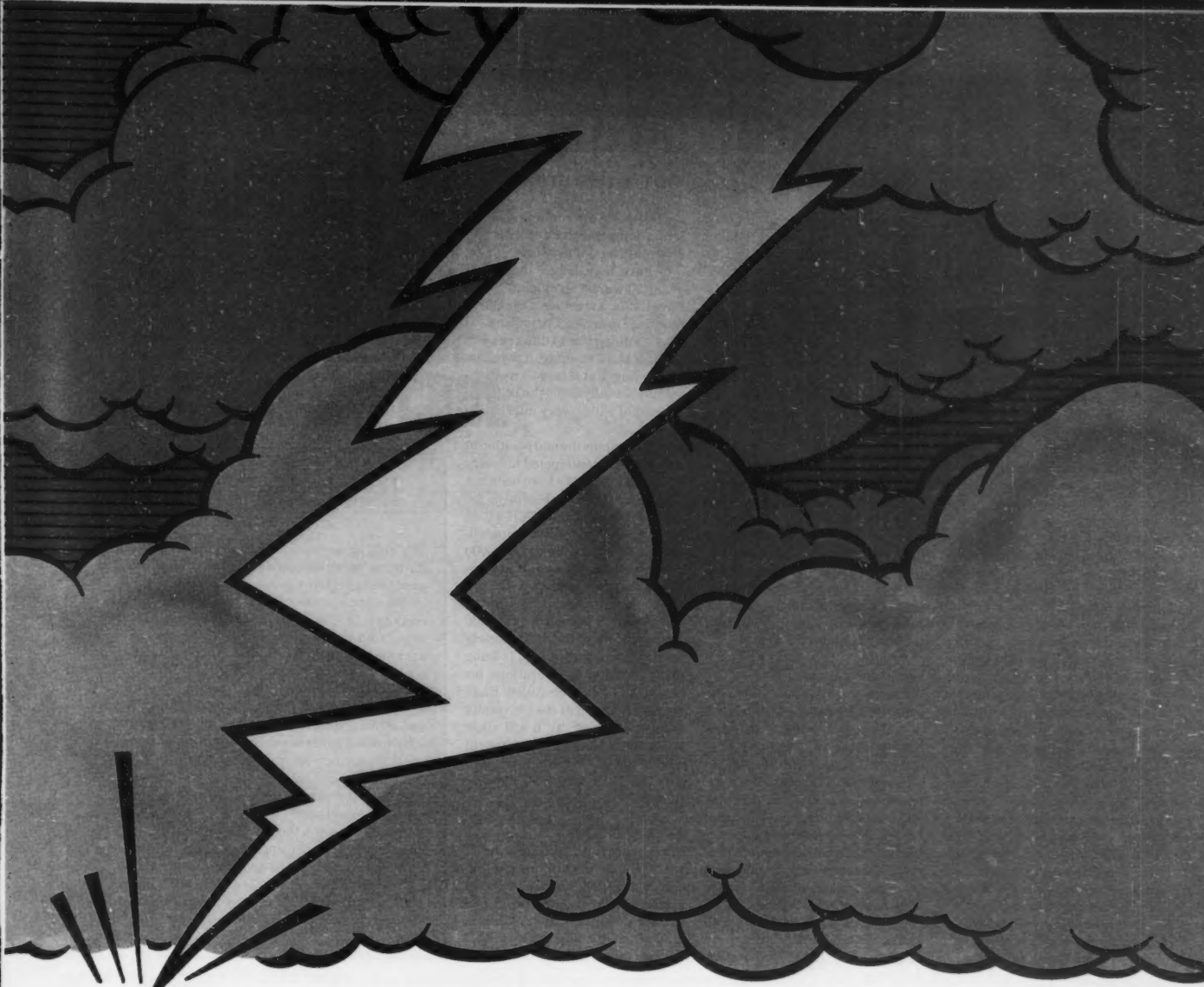
portion of its DoubleSpace data compression utility, from the latest DOS 6.0 beta-test release. MaxCompress is an "off-line procedure" that provides DoubleSpace with its "maximum compression," according to documentation included with previous DOS 6.0 beta-test versions. The technique uses larger data spaces for encoding compressed data.

Last month, Stac Electronics, Inc. accused Microsoft of using its patented data compression technology, called Stack, in the DoubleSpace portion of DOS 6.0 without a license.

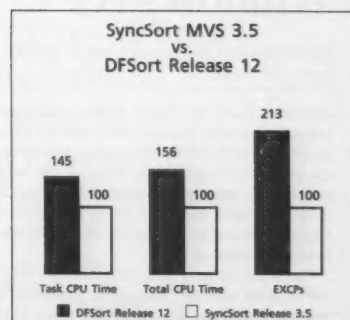
A Microsoft spokesman said the company removed the MaxCompress portion of DoubleSpace in response to Stac's lawsuit. "Lawyers are cautious people," he said. "They advised us that we should remove it from beta" testing until they finish reviewing Stac's patents, the spokesman added.

Microsoft's letter said it was "continuing to research the MaxCompress feature" and it may not be released in the commercial product.

Cunningham is IDG News Service's U.S. correspondent.



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DCE on track; still hurdles

Several events planned to showcase middleware's features

By Maryfran Johnson
CAMBRIDGE, MASS.

With its next major release slated for March 17, the Open Software Foundation's Distributed Computing Environment (DCE) technology is slowly picking up momentum in user sites around the country.

Although rarely found in any serious production environments yet, the distributed computing services that make up DCE are being tested in places as diverse as a Northwest grocery store chain, a major Texas oil company and a New York bank. In all, nearly 200 user sites are now working with DCE technology, according to OSF officials.

Yet there are still substantial hurdles facing DCE. One is the paucity of independent software vendors that have publicly committed to engineering use of the DCE services in their applications. Another is DCE pricing (see story at right), considered by some to be an obstacle to the widespread adoption it needs to become a true industry standard.

"It's something of a chicken-and-egg problem," said Jeanette Horan, vice president of interoperable technologies at the OSF. "End users say there aren't enough applications, and [independent software vendors] say there are not enough users demanding it."

DCE is an integrated set of system management services and tools for providing functions such

as remote procedure call, network time service, distributed file and naming services and security. This "middleware" software is intended to make multivendor networks appear as one seamless environment.

"We're just beginning to run DCE on our [IBM] RISC System/6000s," said Michael Zeitlin, team leader at Texaco, Inc.'s Integrated Visualization Technology Division in Houston. "We'll be using it to deal with additional network resources that are otherwise idle."

At Du Pont Co. in Wilmington, Del., applications are being written to DCE in the company's computer laboratory, with a focus on integrating a variety of platforms. Other firms with DCE projects under way include The Boeing Co., Mitre Corp., Citibank NA, Charles Schwab & Co., Atlantic Richfield Co. and Shell Development Co.

Industry support

For Associated Grocers, Inc. in Seattle, DCE's attraction is its aura of widespread industry backing. "There are so many definitions of open, and people are twisting the meaning of it. DCE compliance appears to be something you can hang your hat on," said Richard Lester, vice president of information services at Associated Grocers. The technology, he added, is "exciting but immature."

Planned for this spring is a series of events — culminating in Challenge '93 on May 24-25 — at which the OSF hopes to showcase

the DCE software running smoothly and doing real work on a distributed multivendor network.

"I have high hopes that Challenge '93 will be significant," said Dave Eaton, a member of the OSF's End-User Steering Committee. "If it's something like 14 different versions of Motif running, it won't be interesting. But if there are applications actually using the DCE services, that will be very interesting to see."

DCE occupies the odd position of being a widely trumpeted industry standard that users have been unable to buy until very recently.

IBM began shipping DCE-based application and server capabilities on AIX Unix for the RS/6000 line just two months ago, and Hewlett-Packard Co. will ship its DCE implementation for its HP/UX version of Unix at the end of this week.

One customer waiting eagerly for HP's shipment of DCE is Doug Eltoft, director of operations for the Iowa Computer Aided Engineering Network at the University of Iowa at Ames. "DCE will allow me to administer more equipment with less staff," Eltoft said. "I don't care that there aren't any applications for it yet."

Not like NFS

Eltoft characterized DCE as basic networking software designed to deal with security and distributed systems in a way the Network File System (NFS) never was. "DCE is fundamentally different from NFS because it has low network traffic

and does lots of file caching, so it keeps information local," he explained.

The scheduled March 17 release of DCE Version 1.0.2 — source code shipped to the vendor licensees, not to users — will include additional security enhancements, a debugged and improved Distributed File System and overall performance improvements.

Users and analysts agreed that DCE will not show up in full production uses until the improved version of the Distributed File System is shipped with the next round of DCE products from vendors such as IBM, HP and Digital Equipment Corp.



Rocketing revenue

Revenue for DCE has ramped up from \$570,000 in 1991 to about \$7 million last year — a figure that includes license fees, royalties, technical services and support.

Deciphering DCE pricing

OSF officials are reconsidering the pricing and licensing terms of its DCE technology, which many users and analysts say is too expensive and overly complex.

"We want to make it easier for our licensees to incorporate DCE into their products and ship it in volume," said Jon Gossels, the OSF's business-area manager for DCE. "Market conditions have changed, and it's time to update things."

The DCE price list has nearly two dozen prices listed, covering everything from full distribution rights and object code fees to optional services. Currently, a software vendor that wants to build applications using DCE services would pay a \$15,000 license fee.

Hardware vendors incorporating DCE object code into their operating systems or layered software products would pay \$150,000 for full distribution rights. But on top of those license fees are royalty fees for each product sold, and those range from \$75 down to \$5 per copy for high-volume products.

There are also separate prices for additional DCE "optional services" such as the directory service or security service, each of which costs \$400.

—Maryfran Johnson

Microsoft offers training for Windows NT

By Christopher Lindquist and Jean S. Bozman
REDMOND, WASH.

Microsoft Corp. last week began drafting recruits into what it hopes will be a worldwide army of trained Windows NT support professionals ready to install and support the next-generation operating system and train others to do the same. However, users and analysts contacted remain skeptical about the effectiveness of the approach.

The training program, called Inside Track, began here with 500 attendees, including resellers, integrators and corporate users, being trained in the installation and support of Windows NT, which just entered its second beta-test phase. After successfully completing the three-day program, attendees receive a Microsoft Certified Professional rating. As part of the



Trainee turnaround

Microsoft's Inside Track program started with 500 attendees at the Redmond session, but according to Microsoft, that number will increase to more than 100,000 by the time the worldwide training program has been completed.

agreement for attending the session, each participant is also expected to train at least 50 more individuals.

Some customers indicated that the program seems to be little more than a formalization of processes that have been going on for some time. "It will not change the way we do business," said Louis Kahn, network administrator at the Centers for Disease Control in Atlanta.

Kahn said the Centers' internal information systems group is currently trained to handle "front-line" support, with follow-up support requests referred directly to Microsoft. He added that the idea of going to third parties for support was unacceptable in his case. "We only allow internal MIS to mess with our network."

A bit premature

An IS manager at a large foods company said he declined Microsoft's invitation to attend the session. "We think it's a little too early," he said. "We're excited about NT, but it may be too much to digest right now."

Doubts about Microsoft's understanding of large-site information systems were echoed by others. "I still question Microsoft's capability to move into the real world of data processing," said Donald Feinberg, a program director at

Gartner Group, Inc.'s Software Management Strategies service. "I don't believe they have the infrastructure for sales and support for that, and I don't think that spending a couple of hundred million dollars on it is enough."

Other analysts agreed with that assessment. Donald Depalma, senior analyst of software strategy at Forrester Research, Inc. in Cambridge, Mass., said that to truly gain the trust of large companies, Microsoft is going to have to increase its internal support and systems integration capabilities because simply training third parties will not be enough.

"I'm not sure that having a bunch of hangers-on is going to make the Fortune 500 feel warm and fuzzy toward Microsoft as a strategic vendor," he said.

For its part, Microsoft does seem willing to try, with new licensing and service policies being offered on the menu. Customers contacted said Microsoft is improving its dealings with IS. And Microsoft is working to establish the idea of third-party, vendor-assisted support as a new model.

"The days of the cradle-to-grave vendor are gone," said Dwayne Walker, director of Windows NT and networking products at Microsoft. "We won't try to be all things to all people."

DISTRIBUTED QUERY COMPARISON

SYBASE

90 LINES OF COMPLEX CODE

```
/* reset the counter for build of third table */
CREATE PROCEDURE la_qty
/* for use on WESTCOAST server */

/* returns count for one part only */
@partno char(6),
@la_count int output
AS
SELECT @la_count =
(SELECT qty FROM la_parts
WHERE partno = @partno)

DECLARE @cnt int
DECLARE @counter int
DECLARE @la_count int
DECLARE @partno char(6)
SELECT @cnt = COUNT(partno) FROM ny_parts

/* ny_parts is the parts master; need count
for sequential comparison with la_parts
to simulate a distributed join */

SELECT @counter = 0

/* create temporary table for part numbers
and quantities from ny_parts */
CREATE TABLE #allparts1
(partno char(6) NULL,
ny_qty int null)

/* create temporary table for row numbers
for sequential call of la stored procedure */
CREATE TABLE #allparts2
(seq int)

/* create temporary table for
sequential build from first two temp tables */
CREATE TABLE #allparts3
(partno char(6) NULL,
ny_qty int null,
la_qty int null,
seq int)

/* build sequence numbers for each ny row */
while @counter < @cnt
begin
select @counter = @counter + 1
insert into #allparts2 (seq) values ( @counter )
end

/* populate temp table with ny parts and quantities */
insert into #allparts1 (partno, ny_qty)
select ny_parts.partno, ny_parts.qty from ny_parts
```

ORACLE7™

3 LINES OF INDUSTRY STANDARD SQL

```
SELECT NY_QTY, LA_QTY
FROM NY_PARTS, LA_PARTS
WHERE NY_PARTNO = LA_PARTNO;
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News Shorts

Macintosh gains AS/400 link

Apple Computer, Inc. and IBM moved to close the interoperability gap between their platforms with Apple's introduction of an application that allows its Macintoshes to work on IBM-based networks. Apple said the SNA, ps 5250 emulation software package enables the Macintosh to behave like an IBM terminal and access thousands of applications available on IBM's Application System/400. The package is slated to go on sale in June and retail for \$345.

Insurer outsources

The Continuum Co. in Austin, Texas, won an application development contract under which it will implement a policy administration system for two insurance companies. The agreement with **Fidelity Union Life Insurance Co.** in Dallas and **North American Life and Casualty Co.** in Minneapolis is valued at about \$11 million during the first three years, with seven-year renewal options worth \$25 million. The insurance firms are subsidiaries of **Allianz AG** in Munich, Germany, and are merging into a new company, **Allianz Life Insurance Company of North America**.

Wireless moves by Motorola

Motorola, Inc.'s Interactive Data Systems Group in Boynton Beach, Fla., said it would introduce a card-size version of its NewsStream Advanced Information Receiver by midyear. The NewsCard is aimed for use in several PCs and "personal communicators" due out later this year. Meanwhile, **AT&T** connected its EasyLink Services electronic mail to Motorola's Embarc wireless delivery service allowing AT&T Mail users to send messages to portable computers in more than 200 cities.

Novell, RBOC team up

In a deal that **Novell, Inc.** said is likely to be the first of many partnerships with telecommunications carriers, the local-area network company announced last week an alliance with **Pacific Bell** aimed at ensuring interoperability between Novell internetworking equipment and the phone company's wide-area network services. The goal: to allow resellers to offer turnkey packages, including communications links for interconnecting NetWare LANs across WANs.

HP adds analysis tools

Hewlett-Packard Co. announced the first three applications that can analyze traffic samples taken by its Embedded Advanced Sampling Environment (EASE). EASE continuously monitors traffic traveling through HP Ethernet hubs and bridges. OpenView History Analyzer compiles historical data, such as network services and protocols used. OpenView Traffic Expert can build a set of rules for a well-behaved network and generate a printed report prescribing actions to improve performance. OpenView Resource Manager provides a real-time view of all network segments across the enterprise.

SHORT TAKES IBM plans to expand use of HP's Soft-Bench technology beyond the original AIX environment by implementing it on non-Unix systems, such as OS/2. . . . **Computer Associates International, Inc.** has announced plans to bundle its CA-20/20 spreadsheet into its CA-Unicenter for Unix systems management portfolio. . . . **Axi Workstations**, a division of Hyundai Electronics America, introduced two Scalable Processor Architecture-compatible Unix workstations: the \$3,600 Axi 220 Professional and the \$7,000 Axi 220 Workstation.

News shorts, page 16

Pitney Bowes cuts paper

Unix-based client/server system to provide seamless flow of info

By Elisabeth Horwitt
SHELTON, CONN.

■ Providing seamless, paperless information flow from sales all the way to the shop floor is still a far-off goal for most manufacturers, but not for Pitney Bowes Mailing Systems.

This spring, the Pitney Bowes, Inc. operating unit here should finish installing a Unix-based client/server system that will become the standard platform across engineering and manufacturing work areas.

The guts of the platform will be "master servers" based on Digital Equipment Corp.'s Alpha and Hewlett-Packard Co.'s HP 700s running the Open Software Foundation's OSF/1, said George Billings Jr., the unit's manager of network computing services.

Those servers will house engineering specifications and designs, as well as up-to-date production scheduling data. Manufacturing and engineering users will be able to access that information transparently, independent of where they are located and which server houses the data, he added. A fiber-optic network will link client and server systems in five sites scattered across Fairfield County, Billings added.

Time reduction

The primary use for the above platform is a concurrent engineering system that Pitney Bowes expects to have fully implemented by year's end, said Al Schmidt, director of operations development. The system will replace a traditional paper-based environment and reduce product cycle time by 50%, according to Paul Reece, the unit's vice president of corporate engineering and technology.

The guts of a concurrent engineering system is a database of engineering drawings and specifications. Such systems provide "continuous improvement in both

product quality and time to market" by ensuring there is one consistent set of drawings and specifications that both engineers and manufacturing managers can view electronically, according to Ted Rybeck, director of research at Advanced Manufacturing Research, a consulting firm in Boston. Concurrent engineering is still a distant goal for most manufacturing companies, Rybeck added.

Under the old paper-based system at Pitney Bowes, "it typically took weeks to collect the information, get it to the person, do the review process [and] make sure people agree on what's wanted," Reece said. "Now the designer can put the concept together [and] download it to the model shop," which then uses it to generate a prototype for manufacturing, all without paper, he added.

The result from early implementations in engineering and manufacturing tooling areas was that the design cycle of some products was down from five or six weeks to two or three days.

One example: Under the old paper-based system, manufacturing often wasted precious hours chasing down engineers with questions about a given part, according to Pat Leahy, manager of engineering information systems. Frequently, too, manufacturing would end up working from an old or incorrect version of an engineering drawing, which would result in weeks or

even months of delay while a part was retooled.

Under the new system, manufacturing and engineering can call up the same drawing on their respective screens and discuss it over the telephone, Leahy said.

This kind of electronic communications will grease the re-engineering and change request processes, said Richard Mould, manager of advanced manufacturing systems at Pitney Bowes. "It's the best thing that's happened to me since I came here."

Paperless payoff

The real payoff, however, will come when Pitney Bowes implements paperless information flow down from the field sales force to the manufacturing execution systems and from marketing to engineering, Rybeck said.

Pitney Bowes expects in late 1993 to begin work on systems to provide information flow "right down the supply chain from the field to manufacturing," Schmidt said. Such links will provide tighter integration with the field so that salespeople, for example, could use their PCs to access product pricing and configuration information and send new orders to manufacturing in a "paperless, seamless fashion," Schmidt said.

Also in the works are links to marketing systems that would enable engineering and manufacturing to "respond quickly to marketing data on changing customer demands," Schmidt said. "Our ability to develop products competitively" depends on such systems, he added.



Paul Reece says system will cut product cycle time by 50%.

Facing integration challenge

This next phase of systems integration poses a new level of challenge in that it requires integrating the corporate IBM 3090s that house marketing, sales and accounting applications with the client/server-based concurrent engineering platforms, according to George Billings, manager of network computing services.

This, in turn, will require cooperation among corporate IS, manufacturing and engineering systems departments.

Such cooperation is crucial because the above IS projects will support a business strategy that the unit settled on about three years ago, said Al

Schmidt, director of operations development. The strategy centers on dispensing with the old "serial" product cycle in which "someone up front decides what the market requirements are, then it goes to engineering, then manufacturing and then you ring up a person in sales and say, 'Guess what—we have a product. Now sell it,'" Schmidt said.

Under the new regime, which Pitney Bowes will be implementing through 1994, "from Day 1, a core team with representatives from all disciplines—marketing, engineering, manufacturing, sales, IS—makes a product happen," Schmidt said.

—Elisabeth Horwitt

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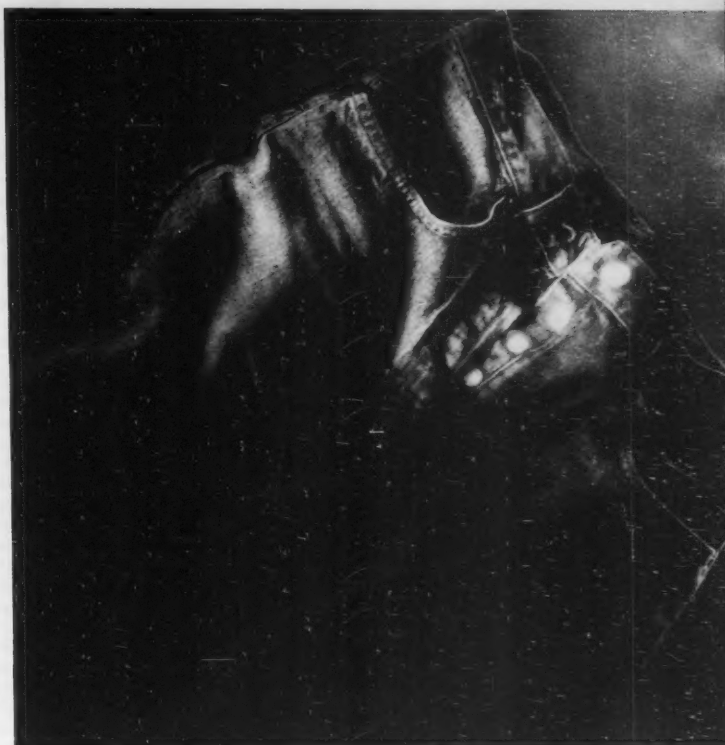
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Oracle eyes groupware battle

Sparks fly over relational vs. object orientation for cooperative computing

By Michael Vizard

As Lotus Development Corp. gears up to deliver Notes 3.0 next month, a religious war over whether relational or object-oriented database models provide the best platform for groupware applications will be heating up.

That is because database giant Oracle Corp. is in the early stages of developing a suite of groupware applications based on Version 2.0 of its Oracle Mail Server, which provides directory, scheduling and mail services on top of Version 7.0 of the Oracle relational database management system, an Oracle official said last week. That product will be aimed squarely at Notes.

So far, Microsoft Corp.'s Windows for Workgroups product is only a platform for building groupware applications, and Borland International, Inc.'s Netscape is still in the planning stages. And because neither of these companies is positioned as a leading supplier of distributed databases, Oracle has the potential to be a very strong challenger to Notes.

Scheduled to be launched this spring, Oracle's mail server will be integrated with the Oracle RDBMS, a text retrieval engine and extensions to Oracle's SQL implementation that will allow applications to manipulate objects beyond simple rows and columns.

"We're extending the SQL lan-

Object vs. relational

In contrast to the relational model that will be used by Oracle, Lotus uses what it calls an object database in Notes to support any data type, including text, image, voice and video. The current implementation of Notes borrows technology usually associated with object-oriented databases to create a document-oriented file system.

Lotus announced that it has garnered two major international contracts: Unilever, an Anglo-Dutch multinational, will use Notes in a conferencing system that will initially reach 10,000 users. Statoil, the largest company in Norway, will use Notes along with a variety of Lotus PC application packages to support its 14,000 employees worldwide.

guage to support structured objects in the database on clients or any other file system," said Tim Negris, senior director of server product marketing at Oracle. "We'll soon be adding support for real-time video and audio, as well as complex object models, to the Oracle database."

Currently, Version 7.0 of the Oracle RDBMS is capable of supporting up to 2G bytes of binary large objects (Blobs) directly within a field in the database, Negris said. By combining support for Blobs directly in the Oracle server with mail- and text-retrieval technology, Oracle expects to support groupware applications that make use of documents, text, video and audio in direct competition with Notes.

"The database market is stabilizing, and Oracle needs a place to grow. One of those places will be in groupware applications," said Norman Weizer, president of Weizer Associates, Inc., a consulting firm in Lexington, Mass.

But Lotus officials countered that relational databases, which are built around tables and columns of data, will not be able to efficiently support documents in typical groupware applications.

"It's a lot easier to insert objects on an ad hoc basis in an object database than it is to update records in a relational database," said John Landry, senior vice president

for software development at Lotus.

"Using an RDBMS to support documents is like teaching an elephant to fly," added Frank Ingari, vice president of marketing at Lotus. Ingari left Lotus for a brief period to head up Ontos, Inc., a Burlington, Mass., developer of object-oriented databases.

Oracle officials asserted that Lotus has a limited view of groupware applications based on its experience with PC client software. "A table in a database is really just a simple instance of an object," said David Knight, senior manager for server product marketing at Oracle.

Oracle is taking a server-centric approach designed to integrate large enterprises where 50G-byte databases are not uncommon, Knight said. By contrast, the object database in Notes supports databases of 1G byte.

"Lotus assumes a model where there is a lot of code on the client and marginal code on the server. We're assuming a model where you embed a lot of stored procedures on the server to limit code on the client," Negris added.

Weizer noted that information systems departments may favor a relational database approach to groupware because it will give them more control over applications. "With Notes, you have end users building applications until

they are coming out of your ears. A relational database will give you better control over application development," Weizer said. But, he added, "I believe that Notes is probably a better groupware solution right now, but there is room for relational database vendors."

Lotus said it expects Notes databases to be deployed on servers alongside servers running relational databases. For example, a Notes application will use a SQL link to download data from a relational database into a Notes database, which can then be replicated across multiple Notes servers.

According to Ingari, this will allow sites to create office automation applications using Notes that can be linked to RDBMSs that track transactions.

"Notes is designed to handle a whole class of office support functions that the relational database is not designed to handle. When relational databases came on, they were deployed alongside network and hierarchical databases because they handled different types of functions. The same will be true for Notes," Ingari said.

The trade-off for IS directors, however, is that they will have to learn how to administer yet another database technology.

In contrast, Oracle envisions Notes applications as front-end clients to Oracle database servers. "We're inviting Lotus to link their applications to our work-flow server. Notes is appropriate for small application groups, but we believe that our model is better for higher levels of information integration," Negris said.

Oracle's graphical tools both stable but incomplete

By Jean S. Bozman

Early users of Oracle Corp.'s new graphical tool set are expecting a developer's copy to be released next month, with a fully integrated tool set shipping by summer. Users participating in a beta-test program since November said last week that some tool features are working better than others but added that the code appears to be stable.

Users have been anticipating the tools' arrival, including the SQL Forms 4.0 application development tool, the SQL ReportWriter 2.0 report generator and the Oracle Graphics software layer, since last year. The new versions will allow users to build a generation of client/server applications for use with the Oracle 7 relational database. Without them, users have resorted to writing Oracle 7 applications using older, character-based tools [CW, Feb. 1].

One beta-test site, ITT Hartford Life Cos. in Hartford, Conn., plans to use the new graphical tools to retrofit dozens of existing character-based applications. "We can develop a form using a graphical user interface, and we can run

it in on a character-mode or a block-mode terminal," said Jim Bosco, a project manager at the firm.

The insurance company uses Oracle extensively for 40 applications that run on Digital Equipment Corp. VAX machines but has few client/server programs.

Other beta-test sites have started to prototype applications that they will deploy later this year. Garrett Suhm, a systems analyst at Westinghouse Savannah River Co., a large federal contractor that runs a nuclear-fuels reprocessing plant in Aiken, S.C., is using the beta-test tool set to develop Microsoft Corp. Windows client/server applications on DEC VAXstations.

Eager to move

"We plan to be in production by the middle of the summer. We're very motivated," Suhm said, explaining that a new client/server work documentation system will replace dozens of desktop database systems scattered throughout the 1,600-PC site.

Some of the beta-test users said they want to replace independent Windows tool sets such as



Tool test

Worldwide, 100 sites are beta-testing Oracle's tools, 24 of them in the company's "alliance" program of early users, which started in August 1992. Oracle is changing the name of its tool kit to the Cooperative Development Environment. Tool names are also changing: from Oracle SQLForms to Oracle Forms; from Oracle SQLReportWriter to Oracle Reports; and from Oracle Data Browser to Oracle Browser.

Gupta Corp.'s SQLWindows and Powersoft Corp.'s PowerBuilder to gain better integration with the Oracle database. "Oracle is new to Windows, but their strength is certainly the integration with the database," said Kirk Lowery, a senior manager at Price Waterhouse's Dallas office, another beta-test site. "If you've got a strong data model, you can build on what you've already done with SQL Forms 3.0."

Fine-tuning needed

Although the beta-test sites said the new Oracle tools are stable, they also said they were not yet fine-tuned for each hardware platform. For example, applications developed on Sun Microsystems, Inc. workstations sometimes made a poor transition to a Microsoft Windows PC, users said. The placement of some screen elements and the format of some forms changed when the software was recompiled for use on the Windows workstation.

But users said they fully expect many platform-specific problems to be addressed in the production copy. Oracle developers are aware of the problem and of the design requirement that the tools be portable across platforms. The beta-test copy of SQL Forms 4.0 now being used was "frozen" in December, users said. "What's there works, but it's not all there yet," one user said. "I'm waiting to see a more stable production copy."

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(DEPTNO NUMBER(2) PRIMARY KEY,
DNAME CHAR(14) NOT NULL);

CREATE TABLE EMP
(EMPNO NUMBER(4) PRIMARY KEY,
MGR NUMBER(4) CONSTRAINT mgr_fkey REFERENCES EMP,
DEPTNO NUMBER(2) CONSTRAINT dept_fkey REFERENCES
DEPT);

CREATE TABLE PROJ
(PROJNO NUMBER(4) PRIMARY KEY,
BUDGET NUMBER(7,2),
DEPTNO NUMBER(2) CONSTRAINT pdept_fkey REFERENCES
DEPT
ON DELETE CASCADE);
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UB renders hub ATM stepping-stone

By Joanie M. Wexler
SANTA CLARA, CALIF.

Ungermann-Bass, Inc. last week was first out the door with capabilities aimed at making the smart hub the platform of choice for migrating to Asynchronous Transfer Mode (ATM) networking.

UB announced two "ATM-like" mod-

ules for its Access/One hub slated to ship in the second quarter. The products combine the investment-protecting benefits of dedicating the bandwidth of a full 10M bit/sec. Ethernet to a single computer — a function loosely called "local-area network switching" — with the ability to configure workgroups through software commands rather than by plugging and

unplugging cords in a wiring closet.

The point-and-click "virtual LAN" is an inherent function in emerging ATM technology. It will be "key as the open corporation reaches out to customers, suppliers and others, where teams cut across traditional boundaries," said Don Tapscott, vice president of technology at DMR Group, Inc. in Toronto. "Companies

that don't understand this volatile business environment will be toast."

ATM is also touted as the network hopeful for carrying multimedia traffic because of its predictable-delay characteristics and very high speeds.

However, "while we know ATM is the right technology, it's not here, not affordable and will take years to migrate to," said Ralph Ungermann, UB's president.

Interested shops

UB's \$900-per-port Ethernet switching module, called DragonSwitch, will likely be of initial interest to shops with very high network traffic volumes waiting for ATM standards to gel.

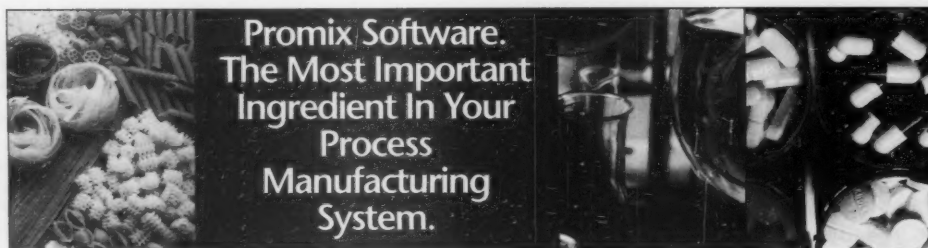
For example, "we see video on the horizon at our specialist trading posts," said Bill Conkling, vice president of communications at Securities Industry Automation Corp., the technology arm of the New York and American stock exchanges. "This switch will help us provide that capability prior to 'real ATM' being available."

Integrating the LAN-per-desktop function into the hub competes with various stand-alone LAN switching approaches from vendors such as Alantec Corp., Artel, Inc., Kalpana, Inc., Lannet, Inc. and Synernetics, Inc. These firms' devices, however, do not handle the wiring concentration function and are limited in the number of LANs they can support.

UB's \$900 per-port cost, while comparable to Kalpana's \$700 to \$900 price tag and significantly cheaper than Synernetics' \$1,500 to \$1,700 per-port, Fiber Distributed Data Interface-based gear, will nonetheless be a barrier to some.

"Whew, steep!" was the reaction of Mike Field, microcomputer coordinator at UB shop James River Dixie Corp. in Fort Smith, Ark. He said his company probably would not need UB's switching module for two to four years.

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Mock ATM

Highlights of UB's announcement included the following:

- Ethernet-based DragonSwitch reportedly boosts network performance by 4,000%. Price: \$900 per port.
- NetDirector/Virtual Network Architecture management software allows users to create and reconfigure up to 65,000 virtual workgroups around the world via point-and-click technology. Price: \$3,500 to \$8,500.
- UB's announcement does nothing technologically to migrate users to ATM. Rather, it aims to familiarize users with some of ATM's capabilities on their existing network infrastructures at lower speeds and costs than to transition them culturally.
- Starlight Networks, Inc., which makes video networking software, said it will port its StarWorks package to the DragonSwitch.

A black and white photograph of a vintage computer keyboard. The keyboard features a row of function keys at the top, including 'MICRO FOCUS', 'HP', 'NCR', 'UNISYS', 'B&F', and 'MPS'. Below these are standard alphanumeric keys. A 'Select' key is visible on the left side of the keyboard.

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GSA Contract Number GS00K90AGS5251-PS02

AS/400 update

IBM refreshes minis

By Johanna Ambrosio
NEW YORK

IBM is pushing its proprietary minicomputer line into the client/server, open systems limelight, starting with its new generation of Application System/400s announced last week.

At the same time, IBM's Application Business Systems (ABS) unit is trying to turn around last quarter's blip on the revenue chart by giving customers something new to buy (see story at right).

In essence, IBM brought out something in the new F series family for both of its major AS/400 user bases: more prepackaged software for its smaller customers; and applications development and systems management packages for its larger users.

Large customers said they are particularly happy with the additional client/server capabilities, which include enhanced support for AIX, OS/2 and Microsoft Corp. Windows clients; a new file server program; and IBM's intention to provide adapters to connect the AS/400 to high-speed local-area networks running at 100M bit/sec.

Jerry Lafien, vice president of computer operations at Farm and Home Savings Association in Ne-

vada, Mo., said his company is looking to bring up an image-based application on its AS/400 Model D60. "At that point, we would migrate to PCs in a Token Ring environment, and obviously, better PC connectivity is important."

On the open systems front, IBM has "finally realized they don't have to be Unix to win," said Teresa Elms, president of Elms Information Services Group in San Diego. "They're saying they will deliver all the tangible benefits of open

Don't look back

Forget the quarter that was not, IBM executives said last week. Instead, look for impressive gains this year from the ABS unit's expanded AS/400 minicomputer line.

Fourth-quarter 1992 was much weaker than expected, despite increased revenue in the U.S., most of Asia and Latin and South America. AS/400 revenue slipped by 2% for the year to about \$4.4 billion.

However, IBM still gained a point in minicomputer market share, moving to 15%. And this year, IBM expects to grow revenue by 3% or 4% over 1992 levels, said William Steuk, an ABS assistant general manager. "Reports of our death have been greatly exaggerated," he said. "We've had 17 good quarters and only one bad one. We'll get back on track again."

—Johanna Ambrosio

IBM network group

CONTINUED FROM PAGE 1

divisions. This ideally gives each division the maneuverability of a small, entrepreneurial company, Hancock said in an interview last week.

More importantly, the unit got its own sales force of more than 500 people last December, Hancock said. Two weeks ago, sales representatives began a training program to get an overall grounding in network technologies, she added.

Another big change is that for the first time, salespeople will now be paid on the basis of how many Network Systems products they sell, she said. "Before, they were paid on how their sales branch did overall."

No choice

Hancock's strategy is competitively necessary, said David Passmore, a vice president and service director at Gartner Group, Inc. "One might argue that even if [Network Systems] is autonomous, a \$5 billion company is still too big to move quickly to respond" to changes in the market.

The effectiveness of this strategy is apparent from IBM's 1992 re-

Educated guess

IBM estimates its 1992 worldwide networking revenue at \$5.3 billion. Business units are listed in descending revenue order:

- Network Processor Systems.
- Local-Area Network Systems.
- Networking Products.
- Transaction Systems.
- Enterprise Management.
- Voice Enhanced Solutions.
- Advanced Transport, Multimedia and Wireless.

turns. While IBM continues to founder, the Network Systems unit pulled in \$5.3 billion, meeting revenue commitments and exceeding profit and return on assets commitments, Hancock said. She declined to get more specific.

One of the most important new freedoms Network Systems enjoys is the right to make its own R&D investment decisions, Hancock said. "Before, when other lines of business wanted something from us, we had to provide it." Now her unit has the option of saying, "You want that? You pay for it," she said.

As a result, Network Systems is now putting 20% of its development money into "mature markets" and 80% into "high-growth markets," such as local-area network hubs and multimedia systems, Hancock said.

Better time to market

Some measure of R&D autonomy is key if IBM wants to be a viable seller of "hot boxes, such as the latest Asynchronous Transfer Mode [ATM] switch," Passmore said. "To do that, IBM has to radically improve time to market" for such products, he said, adding that IBM must train its sales force to be more aggressive selling non-IBM products: "They have no choice."

Network Systems has already

systems without having to be Unix. They want ease of integration so they can plug and play in open networks."

IBM said it will incorporate the Posix and X/Open Co. standards into the AS/400, as well as allow customers to build applications using the Open Software Foundation's Distributed Computing Environment (see story page 4).

Particularly important for large users is the Integrated Language Environment, which will allow customers to mix and match languages when developing an application. It also "lays the groundwork for object-oriented languages on the AS/400," said David Andrews, president of ADM Consulting in Cheshire, Conn.

Still, there are sore spots for some AS/400 customers. Marc Cohn, senior vice president at Enterprise Rent-a-Car in St. Louis, which runs its operation with nine AS/400s and PCs, lauded the machine's ease of use. But he also said, "We do quite a few things we're not thrilled with to try to pretend it's one machine for the 11,000 employees who use this." The new systems management software will be helpful, Cohn said, "but we need an increasingly adept set of tools" to manage that complex an environment.

Also, James Matsey, corporate director at Reynolds Metals Co. in Richmond, Va., said he is in the process of installing 43 IBM RISC System/6000 Unix-based machines because of their superior price/performance. "IBM tried to bid AS/400s initially, but the RS/6000 was the clear winner," he said. "Our plan is to slow down the growth of the AS/400 by implementing more open systems over a period of years."

Analysts said it is only a matter of time before IBM will have to implement the reduced instruction set computing chip in the AS/400 to get costs down even more.

Aim to please

IBM's AS/400 rollout included the following:

- The F series, 14 new processor models featuring price/performance improvements averaging 26%. Prices from \$10,500 to \$1.1 million. Most available March 5.
- Version 2.3 of the operating system provides license management of software with user-based pricing. It ships in December.
- Higher capacity models of disk, tape and optical devices.
- Systems management software from Candle Corp.
- The Integrated Language Environment lets customers use the most efficient language to write program modules. Available in December.
- An implementation of Sun Microsystems, Inc.'s Network File Server.

cut average development cycles from three years to two, Hancock said. The unit has announced its intention of being one of the first major vendors of ATM switches.

Still at issue is whether Network Systems can establish credibility

by sticking to [SNA]," said Doug Underhill, an assistant vice president at CSX Corp.

The numbers support this view: IBM mainframe-based systems still accounted for more than 50% of Network Systems revenue last year, Passmore said. And Network Products, the Network Systems division responsible for VTAM, Transmission Control Protocol/Internet Protocol and Open Systems Interconnect products, owed 86% of its 1992 revenue to VTAM product sales, Hancock said. "We are still seeing revenue growth from mainframe network systems, which means we can still spend R&D money on that, but client/server is clearly a larger growth field than mainframes," she said.

But Underhill added that he was encouraged because attaching IBM systems to non-IBM computers and network protocols no longer requires such a "Rube Goldberg wiring" arrangement of bridges, protocol converters and routers.

Still, one Fortune 500 firm rejected IBM's network management proposal last year, primarily because the solution had too many pieces, said a telecommunications manager, who requested anonymity. Also, Network Systems representatives "used too many acronyms; they were almost indecipherable," he added.

From around the world

85% of IBM's network revenue is generated in North America and Europe

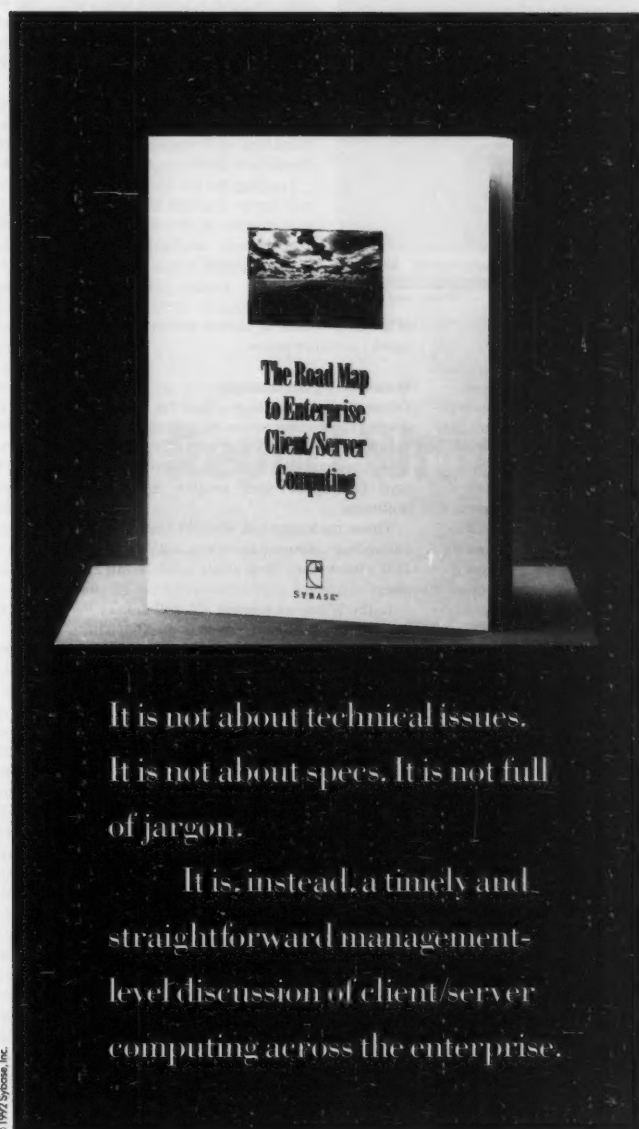


Source: IBM

as a multivendor networking supplier. Even if the unit is no longer at the beck and call of other IBM businesses, some users said, non-IBM support is lackadaisical.

"They have moved out of rock-hard SNA position with TCP/IP and Ethernet support available, but it isn't clear whether that's a place-holding move because they figure they can't capture all of the market

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CA gears up for micro assault

Poised to do battle with rival's Windows, OS/2 desktop applications

By Michael Vizard
ISLANDIA, N.Y.

During the next six weeks, Computer Associates International, Inc. will make good on 1992 promises by delivering three upgraded Microsoft Corp.'s Windows applications and two upgrades to existing DOS applications.

The company said it also plans to launch six IBM OS/2 2.0 applications as part of a concerted effort to boost its rising profile in the PC software market.

CA's main focus is on the integration of its disparate PC software packages, which will eventually allow them to support the same macro language.

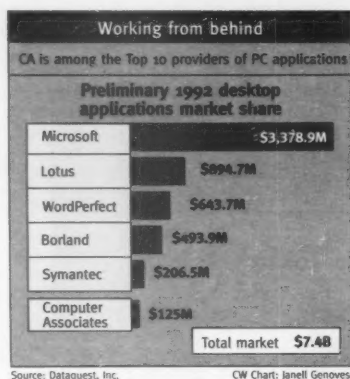
That language will be based on Version 2.0 of CA-Realizer, which is a Basic development environment for Windows and OS/2 2.0 that competes with Microsoft's Visual Basic language.

CA business applications will have a single standard macro language using Realizer, which provides an environment for building applications across multiple platforms, said Marc Sokol, director of product strategy at CA.

"Realizer will provide one consistent front end to CA applications so that you don't have to keep switching to different file formats when moving from manipulating a dBase file and a spreadsheet file," said Ron Moore, president of Marketing Technologies Group, a consulting firm in New York.

Variety is the spice of life

Most of CA's PC software revenue has been generated by accounting packages. The coming product onslaught is intended to leverage the company's installed base to sell a variety of ap-



Real deal

Tandem Computers, Inc. is using Realizer to develop a PC front end for a network management application that will monitor traffic across its distributed on-line transaction processing systems. "We went with Realizer because it has better graphics and charting capabilities than Visual Basic," said Mike Kolligan, a Tandem developer in Chicago.

lication development tools, databases, word processors and spreadsheets that will be available on both Windows and OS/2 2.0.

"PCs are now a recognized option at mainframe sites, and more powerful macro tools should help users do consolidations across PC packages," said Sheldon Needle, president of Computer Training Services in Rockville, Md.

Leading the CA lineup of products for next month is Version 5.0 of Compete, a multidimensional spreadsheet available on Windows and OS/2. It was designed to counter Lotus Development Corp.'s Improv spreadsheet for next week (see story below).

Windows, which is slated for delivery next week (see story below).

Oncoming onslaught

Other OS/2 2.0 packages that CA will deliver during the coming weeks include versions of its CA-dBaseFast database, entry-level CA-Simply Accounting package, CA-Textor word processor and CA-SuperProject project management software.

These packages will support OS/2's Presentation Manager user interface, with support for IBM's Workplace Shell utility to follow later this year.

In the Windows market, CA will deliver Version 2.0 of CA-dBaseFast, which is an Xbase database for Windows.

And in the DOS market, it will deliver Version 5.2 of CA-Clipper for DOS, which is an application development environment; CA-Clipper Tools, which is an extended library for CA-Clipper; and a compiler that links CA-Clipper with dBase IV databases.

In addition, the logic from which the spreadsheet was created is displayed in English, which makes it easy for auditors to check the validity of the assumptions used to create a spreadsheet.

In direct competition with Improv will be Version 5.0 of the Compete multidimensional spreadsheet from Computer Associates International, Inc. in Islandia, N.Y. The new release of Compete is expected to go into beta-testing shortly, with the production release scheduled for the end of next month (see story above).

"Frankly, we have had trouble explaining what Compete is to the market. . . . So we're glad to see Lotus educate the market on the need for multidimensional spreadsheets," said Marc Sokol, director of product strategy at CA.

Compete is priced at \$495. However, users can expect to see CA respond aggressively to any pricing initiatives from its rivals, Sokol said.

Chevron gets cake, eats it too

By Michael Vizard

Looking to circumvent site licensing restrictions, Chevron Corp. has decided to enlist the aid of a PC software distributor in an effort to gain the benefits of volume purchasing without having to make a specific commitment to one PC software vendor.

The company announced last week that it had signed a deal with PC software distributor InfoNow Corp. in Boulder, Colo.

"We have a lot of individual business units with their own budgets, so we can't really forecast our needs to take advantage of site licensing deals," said William David Johnson, a systems analyst at Chevron.

PC software vendors have been aggressively pushing site license deals. Microsoft Corp., for example, recently unveiled its Microsoft Select program [CW, Feb. 1], while rivals such as Borland International, Inc. and Lotus Development Corp. have had similar programs in place. All of these programs offer a range of discounts that require customers to plan and commit to minimum purchases—in one case as far as two years in advance.

"PC software companies are starting to aim pricing strategies at corporate IS rather than the departmental level, and the lines between the departments and corporate IS infrastructure are starting to blur," said Tina Foraker-Blackwell, research analyst for advanced software development at New Sciences Associates, Inc., a consulting firm in Westport, Conn.

Licensing drawbacks

But for customers such as Chevron that cannot make forecasts because of the diversified nature of their operations or that do not meet volume commitments required by vendors, site licensing deals from vendors can be problematic.

Some firms also object to being locked into a specific product or fear losing control to a vendor. For example, Chevron is currently committed to PC applications from Lotus but is also evaluating software packages from Microsoft.

But Chevron's biggest issue with site licensing deals is that they typically require a company to commit to a large number of licenses, Johnson said.

To avoid this, Chevron will make use of InfoNow's CD-ROM-based software distribution service to purchase software licenses on an as-needed basis. As the number of purchased licenses increases, the discounts offered by InfoNow also increase, allowing Chevron to benefit from volume discounts without requiring an annual commitment.

This approach also frees Chevron from the costs incurred by administering the distribution of PC software and the costs associated with making PC disks.

InfoNow's CD-ROM service has been integrated with Chevron's purchase order system to simplify billing. Beyond the cost of integrating with the CD-ROM service, Chevron's only other cost is the price of the software because InfoNow tracks individual purchases. "With the InfoNow deal, we expect to save millions of dollars over a site license deal," said Monica Bellini, lead systems analyst at Chevron.

PC applications

Lotus launches \$99 Improv into raging spreadsheet war

By Michael Vizard
CAMBRIDGE, MASS.

Lotus Development Corp. will kick off the next major battle in the spreadsheet wars next week with a \$99 introductory offer for its multidimensional Improv spreadsheet for Microsoft Corp.'s Windows.

"Improv is a new and different product, so we felt we had to create some excitement about it instead of having it work its way into the market slowly," said Said Mohamadioun, vice president of word processing and spreadsheets at Lotus.

The introductory offer is in effect until May 31, after which Lotus will price Improv on par with 1-2-3 at \$495 [CW, Jan. 18].

"At basically \$100, you can't not afford to put it on every machine you've got," said James Alsop, assistant to the president of MIS at Hunt Oil Co. in Dallas, which served as a beta-test site for Improv.

"I think Improv will take off and replace a lot of 1-2-3 and Excel spreadsheets over the next 12 to 24 months. In addition to the gee-whiz features, you get increased accuracy and a more portable spreadsheet that can be documented by others," he added.

Improv is capable of supporting up to 12 different views of spreadsheet data in a graphical format, allowing departments to dynamically reconfigure data from a spreadsheet without having to create a new spreadsheet model.



Improv is targeted at structured data such as budgets where the data is symmetrical. In contrast, 1-2-3 provides more of an ad hoc environment where you can build a structure as you go along.

Sprint to speed transaction processing

By Joanie M. Wexler
WASHINGTON, D.C.

Sprint Corp. last week said it has built a dedicated transaction processing network that will rev up credit authorization and other transaction response times by about 20% to 50%.

Sprint's TranXact network service is slated for commercial availability in May and is targeted primarily at banks and information service providers. According to Dedham, Mass.-based consultancy Vertical Systems Group, it aims to speed transactions that can swing anywhere from one to 30 seconds to a guaranteed 10 to 12 seconds, regardless of time of day.

The goal is to allow companies to provide consistent levels of service to merchants, such as those relying on point-of-sale terminals or electronic cash registers, and ultimately to consumers, said Howard Stern, director of market analysis at Sprint.

Competing for space

Today, transactions are carried on networks that also transport electronic mail, host computer access and other applications, all of which clutter the network with unpredictable traffic patterns and characteristics. Large random file transfers, for example, can hog the network and degrade service.

However, "if you only run one kind of traffic, you could optimize your network for that traffic's characteristics. In the case of transaction processing, that means short and bursty," observed Richard Malone, a principal at Vertical Systems.

In addition to the problem of colliding applications, processing a variety of access protocols shipped to Sprint from the local telephone companies has traditionally slowed response times.

In the TranXact network, services will run across a backbone of customized Sprint TP4900 switches and Primary Access, Inc. feeder devices. The Primary Access gear will blend dissimilar protocols into one X.25 stream before shipping it across a TP4900 network linked by T1 (1.5M bit/sec.) circuits.

This should eliminate delays associated with traffic having to travel through

several pieces of hardware to handle different protocols, Sprint said. The only interface necessary on the user host is X.25, Stern explained.

With TranXact, Sprint is also hoping to bring on-line businesses that traditionally rely on manual transactions, such as fast food, medical insurance and taxicab services, Stern said.

For example, patients visiting a health care provider could use the network to contact their insurance carrier, determine their benefits and electronically file a claim, he explained. And a Sprint cellular packet radio link to local phone companies opens up the credit/debit card business to mobile businesses such as taxi services, he said.

Malone predicted that most carriers' transaction networks will soon have to go "to the next level of bandwidth" because additional identification data, such as voice prints or fingerprints, will likely join these networks and increase traffic loads.

Even today, Malone said, "transaction networks are probably not as responsive as they should be at the point of sale, even though this is supposed to be the decade of service."



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Correction

Because of a misunderstanding, Enrico Pasetori, vice president of Digital Equipment Corp.'s PC business unit, was incorrectly quoted in the Feb. 15 issue about DEC's history in the microcomputer business. The correct quote is: "DEC has made a number of starts and stops because top management [at that time] did not seriously believe in PCs."



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News Shorts

High-tech programs get boost

Despite promised spending cuts elsewhere, President Bill Clinton last week recommended budget boosts for several high-technology areas. He asked for \$103 million more for the U.S. Department of Commerce's Advanced Technology Program, \$188 million more for research and development programs at the National Science Foundation, \$148 million more for the Internal Revenue Service's tax systems modernization and \$81 million more for systems modernization at the National Oceanic and Atmospheric Administration. He earmarked a total of \$47 million more at various agencies for networking and computer applications and \$64 million for the National Telecommunications and Information Administration to speed construction of a national data "superhighway."

Microsoft offers developer aids

Microsoft Corp. has announced a pair of programs aimed at helping both corporate and independent developers identify tools from vendors that intend to support the leading edge of Microsoft technology, including Windows NT, Object Linking and Embedding 2.0 and Cairo. The Corporate Development Partners and Development Partners programs will consist of a new logo that indicates a company's compliance with Microsoft standards as well as services aimed at helping firms identify vendors with products that meet their needs.

Deal offered on Microsoft Office

Looking to put together a major push behind its Microsoft Office suite of PC applications before the company begins upgrading the individual components in the second half of this year, Microsoft this week will announce an upgrade program that will allow sites that own a copy of any PC application software to upgrade to Microsoft Office between March 1 and June 30 for \$569, rather than the normal \$750. According to Microsoft, 40% of its Word and Excel sales are accounted for by sales of Microsoft Office. Microsoft also announced Profit, an entry-level accounting software package for Windows that is aimed at small businesses.

Chen forms new company

Acknowledging that he had failed to find enough investors to save his supercomputer company following the withdrawal of IBM's support, Steve S. Chen last week formed a new company to carry forward his work. SuperComputers International will employ some of the 320 workers from the now-defunct Supercomputer Systems, Inc. in Eau Claire, Wis. Supercomputer Systems ceased operations late last month after IBM withdrew its support.

SHORT TAKES After six years as dean at MIT's Sloan School of Management, Lester C. Thurow will resign July 1 and take a two-year sabbatical before rejoining the faculty in 1995. . . . **Powersoft Corp.** and **Novell, Inc.** teamed up to announce the PowerBuilder Library for NetWare, which is due in the third quarter and will provide a variety of high-level components to access NetWare's print, communications and file services. . . . **Data General Corp.** announced that **Groupe Bull** will integrate DG's Clarion storage systems with Bull's Unix systems and servers and that the two companies will also cooperate on the development of future storage products. . . . **Deborah C. Hopkins** was promoted from vice president of corporate business analysis to corporate vice president and controller at Unisys.

Users bring downsizing demands to Exposition

By Michele Dostert
CHICAGO

Showgoers at last week's Downsizing Exposition here testified that downsizing is still gathering steam, but practitioners have become more realistic about the time, trouble and expense involved.

"There's not a lot of flashy applications being demonstrated here. Instead, people are focusing on data transfer and the underlying plumbing of downsized platforms," said Johnny Swann, a senior analyst at United Airlines in Elk Grove, Ill., which is engaged in a number of downsizing projects.

He echoed the widely held opinion that workable data transfer, though unglamorous, takes more planning and study than was previously expected by eager downsizers.

Plans for the future

Some attendees whose companies are still mainframe-based came to attend strategy sessions. Wally Yee, an analyst at Ameritech, a regional Bell operating company in Chicago, said, "We are interested in gradual mainframe-to-PC transition, so we came to see what

strategies people had used to run the two platforms / together successfully."

Other attendees who have decided to downsize but have not yet picked a platform came to examine the alternatives.

"I know I need a faster, more responsive platform for my manufacturing operations, but I haven't picked one yet," said James Skinner, director of MIS at Piper Aircraft in Vero Beach, Fla.

Many information systems managers who have already chosen and implemented their downsizing platform said they were looking for tools to help them build client/server applications. The most crowded demonstrations were the graphical application-building languages offered by Powersoft Corp. in

Testing demand

IBM representatives quietly demonstrated a downsizing tool that had many of its mainframe users excited — even though IBM currently sells the product only to OEMs. The Personal/370 Adapter A is a single card that contains a full System/370 processor. When plugged into a Micro Channel Architecture Personal System/2 running OS/2, it allows the user to execute System/370 programs and versions of IBM's VM and VSE operating systems.

Burlington, Mass., and Magic Software Enterprises in Irvine, Calif.

"We are looking to build communications-enabled applications for our OS/2 LANs, so we came to the show to look for an API to build them on," said Armando Ortiz, a systems unit manager at Discover Card Services, Inc. in Riverwoods, Ill.

Attendees at the conference, while committed in principle to downsizing, have evidently heard enough horror stories to be more cautious than early adopters.

"There are a lot of issues in architecture design and implementation of downsized platforms that can bite you hard if you're not prepared for them, and I think people are planning carefully these days," Ortiz said.

Hotel cans mainframes

CONTINUED FROM PAGE 1

processor machines from Pyramid Technology Corp. and central reservation system software developed by Anasazi, Inc. and built using relational database software from Informix Software, Inc. running on a Unix operating system. Now the company is updating the Pyramid machines' complex instruction set computing processors with reduced instruction set computing (RISC) processors to take advantage of RISC's faster processing.

Part of that move included updating the software. Last week, Choice Hotels took the system down to recompile nearly one million records in its reservation database to the new database format, a process that took about 17

hours, Yoakum said.

"It was a planned decision to go through with the process," Yoakum said. "If there was some way of

converting safely without bringing the system down, we would do it."

The advantages of the new system far outweigh the limited downtime, Yoakum said. For one, the new system includes marketing information that allows the hotel business to gain immediate access to information booking trends and individual customer preferences.

"As hotels compete for more business, they have to figure out how to provide value," said Victor Janulaitis, chief executive officer at Positive Support Review, Inc., a management

consultant and information technology firm in Santa Monica, Calif. Knowing customer preferences is one way of providing that value, he said.

When the 800 number is down, agents are not able to confirm reservations or get information from the reservation database.

"It's awfully awkward when you depend on an 800 number and that becomes inoperative," said H. Wayne Berens, vice president of industry affairs and corporate travel at American Express Travel Related Services Co. in New York and a member of the American Society of Travel Agents.

The shift to client/server within the hotel industry is a major trend that includes hotel chains such as Hyatt Corp., said Paul LeFort, senior partner of management consulting at Deloitte & Touche's travel and leisure industry and hotel office in Chicago. But, he said, client/server technology still poses systems performance concerns for the hotel industry because of its heavy reliance on computers.

"The client/server-type architectures have relatively embryonic backup-and-recovery capabilities," LeFort said.

Choice Hotels International

1992 sales: \$2 billion.

Hotel properties: 2,889.

Seven chains: Clarion Hotels, Quality Inns, Comfort Inns, Econo Lodge, Rodeway Inns, Friendship Inns and Sleep Inns.

Subsidiary of Manor Care, Inc., which had revenue of \$950 million in 1992.

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A black and white photograph showing a close-up of a hand holding a piece of paper. The paper has a dictionary definition of the word 'neglect' printed on it. The definition includes the part of speech 'adj', the phonetic transcription '-(ə)-niq', and the phrase 'ress by ignoring'. The hand is positioned as if turning or holding the paper steady. The background is dark and out of focus.

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E-mail extended to X.500 services

By Lynda Radosevich
PALO ALTO, CALIF.

The Wollongong Group will start shipping an electronic-mail package on March 1 said to include a Unix-based backbone mail server, integrated X.400 message handling, X.500 directory services and an end-user messaging application.

The company is targeting organizations that use Transmission Control Protocol/Internet Protocol (TCP/IP) for network transport and are moving toward systems based on the Open Systems Interconnect (OSI) architecture.

Called PathWay Messaging, the product will allow users to expand their E-mail systems without continually having to add complicated gateways that are required to link proprietary mail systems, said Doug Ambort, product marketing manager for Wollongong's OSI messaging and directory services.

Analysts said Wollongong's move introduces the company to a growing X.400 market.

"By 1996, we see X.400 passing the proprietary/de facto products like Message Handling Service, Simple Mail Transport Protocol and Systems Network Architecture Distribution Services," said Judith Rosall, program manager for electronic messaging at International Data Corp. in Framingham, Mass.

A step ahead

What distinguishes PathWay Messaging from X.400 competitor Retix's messaging software is PathWay's full implementation of the X.500 directory standard, said Eric Williams, senior systems engineer at Integrated Systems and Communications, Inc., a government systems integrator in Washington, D.C. Retix said it will provide a migration path to X.500 in the future.

In addition, PathWay provides end-user software, whereas competitors Soft-Switch, Inc. and Retix do not, said David Whitten, program director of the office information system service at Gartner Group, Inc. in Stamford, Conn.

Whitten said large organizations are pretty committed to X.400, which he described as the only well-defined, mature E-mail standard. But, he added, "Wollongong will have a tough market to crack because of entrenched LAN E-mail such as CC:Mail."

Need for openness

Virtually all major E-mail vendors provide gateways to X.400 and promise more complete migration paths in the future, Whitten said.

But for organizations such as the U.S. Navy, the need for open standards is here today.

"X.400 is important from a communications point of view because we envision the ship as a node in a global network," said Luther Blackwell, network systems engineer for the Navy's Integrated Interior Communications and Control project. "In order for messaging to take place between ships and shore installations with different E-mail, X.400 is going to be the common protocol to allow those groups to communicate with each other and the outside world."

The PathWay Messaging server will cost \$9,495, and the stand-alone E-mail client will cost \$195 for one node, with discounts for quantity purchases.

Dueling compilers arrive

By Christopher Lindquist
SAN FRANCISCO



Borland holds a commanding lead in the C tools market. In 1992, Borland's C++ posted revenue of \$131 million, compared with \$58 million for Microsoft's C/C++ 7.0, according to Computer Intelligence/Infocorp, a Santa Clara, Calif., market research firm.

Borland International, Inc. and Microsoft Corp. will announce major additions to their C++ compiler lines this week. While Microsoft's offering may help it compete with Borland in the DOS and Windows arena, Borland's entry is intended to help IBM take on Microsoft in the operating system wars.

Microsoft will unveil Visual C++, the successor to its C/C++ 7.0 and QuickC product lines, at Software Development '93 (see story page 61). Visual C++ is something of a departure for Microsoft in that it integrates some of the development features of Visual Basic with the power of Microsoft's optimizing compiler, effectively allowing prototype and primary development in the same language.

Such code-generation tools have been available from third parties, but Microsoft is taking a lead in integrating such tools into the compiler, users said.

A variety of tools are available in Visual C++, including the AppWizard, which automates construction of a program's framework; AppStudio, a graphical screen painter; and the ClassWizard, which automatically connects the screen elements to C++

code. These tools will enable a developer to flesh out an application quickly and then go back and modify it.

For example, Jim Bohannon, a consultant in San Francisco, developed a skeleton of an application in about six hours using Visual C++. The same process had taken him three weeks using Microsoft's C/C++ 7.0, he said.

One limitation of Visual C++ is that it still does not include templates, something users reported they were expecting in this release. Templates

can make it easier to provide an enterprisewide standard for applications developed in C++.

"The template-like thing they've included in the [Microsoft Foundation Classes] is not really templates," said Steve Emmons, lead software engineer at Micrografix, Inc., referring to Microsoft's set of C++ classes for things such as tool bars and dialog boxes. However, he added, that is not going to keep Micrografix from using the compiler. "It has made some significant improvements [over] C/C++ 7.0," he said.

Borland's C++ for OS/2 2.0 — which will also debut at Develop-

ment '93 — does include templates.

"As a developer, I like it a whole lot," said Patrick Little, Comm++ product manager at Greenleaf Software, Inc., a maker of class libraries for several compilers. "It's a big step forward." Little said he plans to do most of his development with Borland C++ for IBM's OS/2 and then port that code back to other platforms.

CompuServe users in the IBM support forum have been asking about the release of Borland C++ for OS/2 for several months, and the advent of new tools can only help the OS/2 market. Borland is also reportedly working on the development of object technology for future versions of OS/2.

Both Visual C++ and Borland's C++ for OS/2 are slated for release March 1. The price for Visual C++ Standard Edition, which lacks some features as an optimizing compiler and a source profiler, will be \$199.

Visual C++ Professional Edition will list for \$499. Borland C++ for OS/2 will be available for a 90-day promotional period at \$149.95. The retail price for the product will be \$495.

Visual C++ may help Microsoft compete with Borland in the DOS and Windows arena.

SQL Server to get 32-bit upgrades

CONTINUED FROM PAGE 1

heavier work loads, longtime users said.

Both the NT and OS/2 32-bit SQL Server systems will have faster performance for several reasons:

more memory, a multithreaded architecture that separates database tasks and the ability to store temporary database extracts in main memory. By pulling frequently used data into main memory, users can eliminate the paging and swapping to disk that slows overall response time. The OS/2 and NT 32-bit database systems can directly address 2G bytes of main memory, far outpacing the 16M-byte memory maximum for the 16-bit database systems.

Despite the advantages of moving to a 32-bit operating system,

some SQL Server for OS/2 users have no immediate plans to migrate. "We are in production on mission-critical systems," said Bill Soper, manager of information

services at Chevron Canada Ltd. in Vancouver, British Columbia. The Chevron Canada headquarters has been developing a suite of new administrative applications on SQL Server for OS/2 since 1989 and has found it takes six months to move from SQL Server Version 1.1 to Version 4.2. "We're not going to move too quickly until we're sure we've got a solid [32-bit] operating system," Soper said.

A year ago, Soper bought two Parallax Computer, Inc. servers for his SQL Server for OS/2 databases, allowing him to use 128M

bytes of main memory. One database runs transaction applications for 40 users; the other has 40 users for decision-support applications.

Boeing Computer Services' SQL Server for NT beta-test software is running appreciably faster than the OS/2 version, said Michael Smith, a software engineer at Boeing in Richland, Wash. The speed-up is because of the fact that users store frequently used database tables in main memory, thus avoiding inefficient paging and swapping to disk, he said.

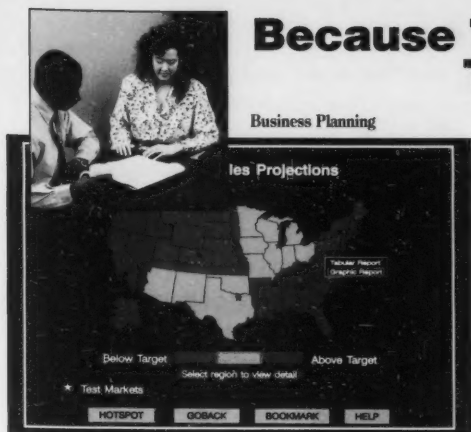
"We've been beating up on the Compaq Computer Corp. SystemPro pretty heavily, and we're seeing differences in response times that are six to eight times better on queries that require data sorting," Smith said. The SystemPro, outfitted with two Intel Corp. i486 33-MHz processors and 80M bytes of main memory, has been running the SQL Server for NT beta-test copy since last fall.

The firm plans to offer a "low-cost platform exchange option" to keep upgrade costs low for users who decide to migrate to SQL Server for NT, Voth said. However, he did not give any details about the NT version's pricing, including upgrade prices.

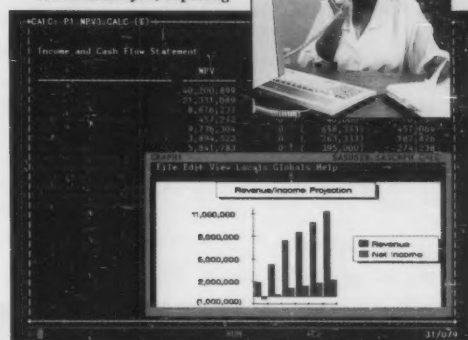
Work to develop a 32-bit version of SQL Server for OS/2 is in progress, said Sybase vice president of marketing Siewart Schuster. "The plan is to be able to ship it by the end of the year," he said.

The OS/2 and NT 32-bit database servers can directly address 2G bytes of main memory — far more than 16-bit systems.

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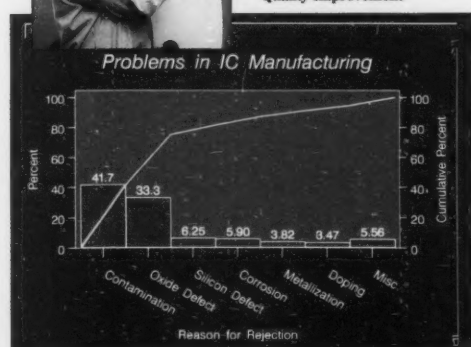
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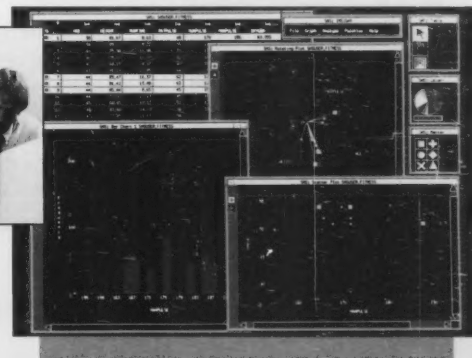


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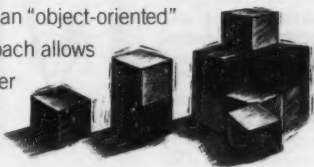
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BUSINESS WEEK, JANUARY 25, 1993

software locked up inside our black box, or do we open it up to industry-standard platforms?

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Our transition will culminate at NeXTWORLD® Expo in San Francisco on May 25th. At this time, we will ship our first shrink-wrapped NeXTSTEP products for industry-standard Intel 486 machines. The best-of-breed applications now available on NeXT computers will be ported to the Intel platform (a routine so simple, it rarely takes more than a day). And all developers of NeXTSTEP software will instantly have new access to a potentially vast mainstream market.

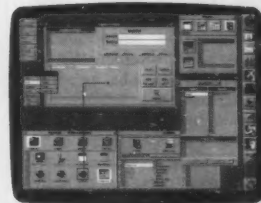
Our goal is to make NeXTSTEP the world's leading operating system—and a development tool that will

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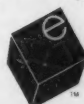
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THE OBJECT IS THE ADVANTAGE.™

Viral threat lingers

CONTINUED FROM PAGE 1

lion" DOS-based PCs worldwide.

The actual damage turned out to be much less, afflicting an estimated 20,000 to 40,000 PCs worldwide, according to Robert Bales, executive director of the National Computer Security Association in Carlisle, Pa. A spokesman for AT&T, for instance, reported that Michelangelo erased data on only two of the company's 250,000 IBM PCs.

And Charles Atterbury, coordinator of microcomputer security at Eastman Kodak Co. in Rochester, N.Y., said scanners found Michelangelo on only about two dozen of "several thousand" PCs.

In the aftermath, some observers said they feared the technodud would cause managers to view their security personnel as latter-day snake oil salesmen. "We thought, 'Uh oh, they're going to think we're crying wolf,'" said Kevin Hemsley, a specialist in the unclassified computer security program at the Idaho National Engineering Laboratory in Idaho Falls.

Yet the virus is actually set to detonate on March 6 of every year, so there could be future disasters if precautions are not taken.

Not to be taken lightly

The possibility of not taking viruses seriously frightens security experts. Computer viruses are real, they emphasized, just like grizzly bears — but they are not lurking behind every tree. "The hype was very exaggerated, but computer viruses are still a very genuine threat," said Bob Brown, a sergeant at the Los Angeles County sheriff's office and a co-founder of the High-Technology Crime Investigation Association, a 400-member organization of law enforcement and security personnel.

Instead, the Michelangelo episode only seems to have reinforced remedial security rules. "There was nothing particularly amazing about Michelangelo," Hemsley added. "Nothing that we couldn't stop doing what we are always supposed to be doing, which is scanning every disk before it enters a PC."

Ultimately, the Michelangelo scare gave end users a much-needed reality check, raising awareness about viruses and general precautionary measures. "Michelangelo finally drove the point down to the end user that security is a critical part of our business and not an add-on," said Catherine Englishman, acting supervisor in the computer security group at AT&T Bell Laboratories in Murray Hill, N.J. "Computer security can't work as an add-on."

The longest lasting result of Michelangelo, then, may be that users are less likely to slip an unscanned floppy disk into their computers. At AT&T, several workgroups have set up a schedule to scan for viruses, where none existed before, Englishman said.

Security awareness

Michelangelo also served to give credence to security warnings. "We kept telling the users to avoid public domain software; Michelangelo allowed us to point to a reason why," one security manager said.

Security managers said they will actively play off the awareness of the need for daily vigilance. At Du Pont Co. in Wilmington, Del., managers have begun an ambitious corporate-wide security program that includes guest speakers and regular security bulletins sent via electronic mail.

"We were always security-conscious, but Michelangelo allowed us to be a lot more aggressive," said Dave Pensak, Du Pont's corporate adviser for computer technology.

Continuing education is a must. Dennis Evans, a systems analyst for data security at the Illinois Department of Revenue in Springfield, said Michelangelo helped propel the launch of a bimonthly security newsletter that he distributes to his company's 2,000 employees. "More than anything, I think that Michelangelo made people realize the necessity for protection," Evans said. "I'm not going to let people forget that."

Evans also noted that as a result of the scare, management has begun to approach computer security in a preventive, rather than a reactive, way. After getting quick

approval from management, Evans updated security on his organization's Novell, Inc. network. "It went very smoothly, and I think Michelangelo may have had something to do with that," Evans said.

Added Bales: "If the Michelangelo scare served as a lever to sensitize upper management to day-to-day security concerns, then I think that all the hype was very useful."

Security experts said there could be dark consequences if Michelangelo's ultimate message of vulnerability is lost. This is particularly true among large bureaucratic organizations, such as the federal government.

"We may just need a disaster to happen before some organizations realize how important computer security is," said Angie King, author of the "Federal Computer Security Market 1992-1997" report prepared by Input, a research and consulting firm in Vienna, Va. "With the end of the Cold War, a lot of people are underestimating our security needs, and that's dangerous. They remain constant."



Precautions not taken

Two-thirds of the 600 firms surveyed by Dataquest, Inc. having fewer than 300 PCs received at least one virus strike this year.

Only 15% of the companies said they had any type of antiviral software installed.

Wake-up call

VIRUS PROTECTION IS NO LONGER AN AFTERTHOUGHT

Did you run antivirus software specifically for Michelangelo before March 6?

Yes, as routine

19%

No

3%

Yes, in response to publicity

47%

Yes, before the hype but not as routine

30%

No response

1%

How much will your organization spend on computer and information security this year?

\$0 - \$10,000

28%

\$10,000 - \$25,000

11%

\$25,000 - \$50,000

9%

\$50,000 - \$125,000

15%

Over \$125,000

29%

No response

8%

Source: Computer Security Institute

Michelangelo paints scary picture for unwary users

Can the Michelangelo virus strike again? It can and will.

Although it is unlikely that the virus will ever achieve the fiendish notoriety it did last year, Michelangelo was designed to activate every March 6, regardless of whether it is featured on the *MacNeil/Lehrer Newshour*.

Michelangelo is a memory-resident infector of disk boot sectors and hard disk partition tables. It is roughly based on the Stoned virus.

The virus works by going into memory the first time a user attempts to start the computer with an infected disk. Once it is memory-resident, it will infect disk boot sectors as disks are accessed. It will also infect the

hard disk partition table as the user attempts to access a file on the hard disk.

On March 6, the virus will format the hard disks of infected systems by overwriting them with random characters from system memory.

While the treatment may seem to be as simple as setting the computer's date past March 6, some users who have tried this have lost everything on their hard disks.

Security experts agree the only effective treatment for Michelangelo is to use good antivirus software to find and remove it.

Finally, remember the three rules of data security: backup, backup, backup.

—James Daly

Vendors agree on Mips ABI

By Maryfran Johnson
SAN JOSE, CALIF.

A group of Unix system vendors, hoping to attract more software to the Mips Technologies, Inc. chip set, today announced specifications for the Mips Application Binary Interface (ABI).

An extended and enhanced version of Unix System Laboratories, Inc.'s Unix System V Release 4 ABI, the Mips ABI aims to provide independent software vendors with a single, binary-compatible port spanning several hardware platforms, including those from Tandem Computers, Inc., Silicon Graphics, Inc. and Pyramid Technology Corp.

Software written to the Mips ABI will run unmodified — without recompiling or relinking — on any member company's hardware.

Other members in the Mips ABI group are AT&T Federal Systems Computer Division, Concurrent Computer Corp., Control Data Systems, Inc., NEC Corp., Olivetti USA, Pellucid, Inc., Siemens/Nixdorf Information Systems, Inc. and Sony Microsystems Co.

Honorary members

Oracle Corp. and SAS Institute, Inc. are also working with the Mips ABI group, whose member companies claim collective 1992 revenue of \$3 billion in the Unix market and more than 140,000 users worldwide. The group, which first came together as part of the failed ACE consortium, is concentrating its efforts solely on the Mips reduced instruction set computing processor and Unix System V.4 operating system.


Although each member company runs a Unix-based operating system, none of them are identical, and few software developers could afford to port applications to all of them, said David Lee, manager of application software marketing at Pyramid.

Alongside Oracle and SAS Institute, 13 software vendors this week announced their commitment to support the Mips ABI in their products. The products include Empress Software, Inc.'s relational database management system, Frame Technology Corp.'s FrameMaker and FrameViewer, Information Builders, Inc.'s Focus fourth-generation language, Interleaf, Inc.'s document creation software, IXI Corp.'s X.desktop manager and Mentor Graphics Corp.'s electronic design software.

Bull's eye!

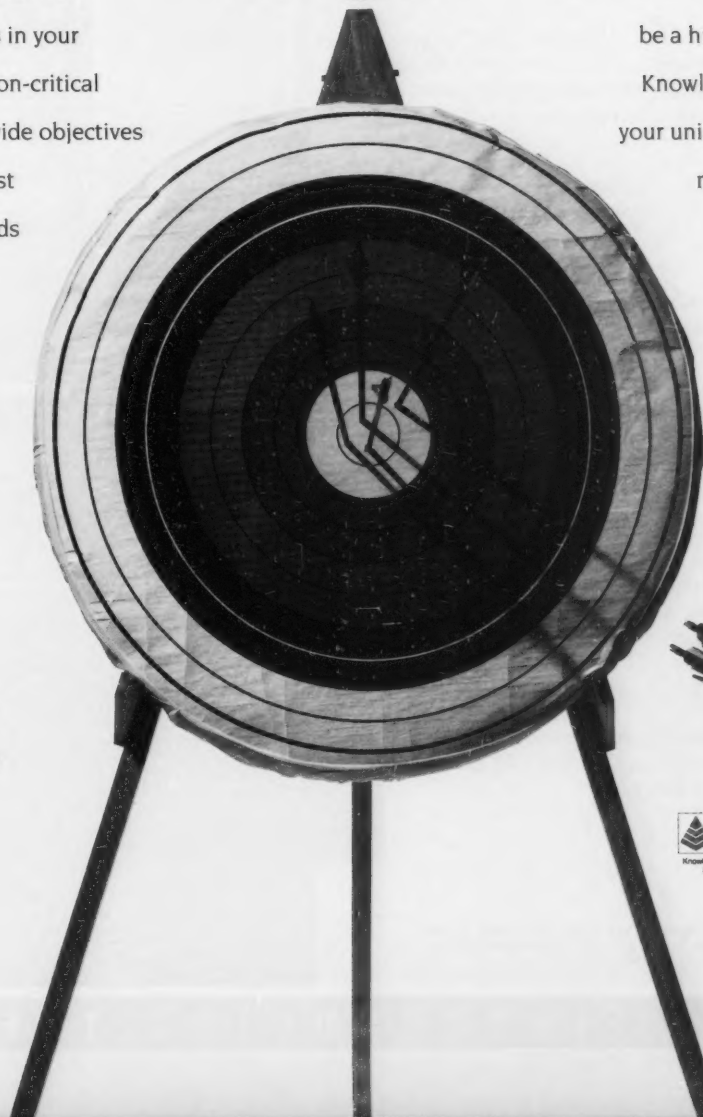
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Robert Palmer

Face to Face

DEC's chief executive officer talks about Alpha and the transition to open systems

Q. What have been the most satisfying accomplishments of your first 4½ months?
A. Getting costs somewhat under control and doing so ahead of expectations. Although our second quarter was a loss, it was less than had been anticipated. It's been satisfying getting as far as we have in defining our new business structure. I'm quite pleased with the progress we're making with Alpha. We're somewhat ahead of schedule on software programs, with more than 2,000 applications committed to Alpha AXP. The momentum seems to be building.

Q. What have been the biggest surprises?

A. I have been struck by how many customers want Digital to be successful and are pulling for us. We need to get organized in customer-focused business units so we can establish contact with those customers and show that we are a different Digital than we had been.

Q. You said you hoped to change the culture at DEC. How have you progressed against that goal?

A. We have been criticized in the past for having such a highly matrix organization that accountability was lacking. Some of that criticism was justified. We've tried to make sure that accountabilities are clear, but this is a large enterprise, and it's going to take a long time to get all these messages across. As we shift over to a business unit model in fiscal 1994, each business unit will be measuring itself against the markets they're playing in. The PC business, for example, is quite different than the model for health care.

Q. How do you prevent these different ways of operating from confusing the customer?

A. The goal is to have the account manager as the interface. But that manager has to have the ability to draw on the resources of the organization. We're trying to eliminate layers between the customer and the chief executive: My goal is to get that down to four or five layers.

Q. You have committed to supporting three industrial-grade operating systems — Unix, Microsoft Corp.'s Windows NT and Open VMS. How do you plan to keep those choices

meantime, we're on plan.

Q. Are you in discussion with Intel Corp.?

A. Not at this time. We talked to Intel, but that was more than a year ago. We're in discussions now [with a major chip maker], and I'm pretty confident we'll have a major

want a vendor that will sell and service the product worldwide. Digital is among the two or three companies that can do that

Q. Does it concern you that Hewlett-Packard Co. is about to pass you as the second-largest computer company?

A. What concerns me is that we provide customers with solutions and return to profitability. HP got ahead of the industry in open systems a few years ago, and you might remember that there was concern at that time about the transition they were making. They came through it, and now they're enjoying the results. I think as we get this [current trouble] behind us we're going to reap the benefits of being a leader.

Q. HP has 20,000 fewer employees than DEC. Do you look to emulate their model?

A. We don't emulate another company's model because our business models are somewhat different. HP is very strong in instruments and printers. We're much stronger in professional services and consulting, and that's a people-intensive thing.

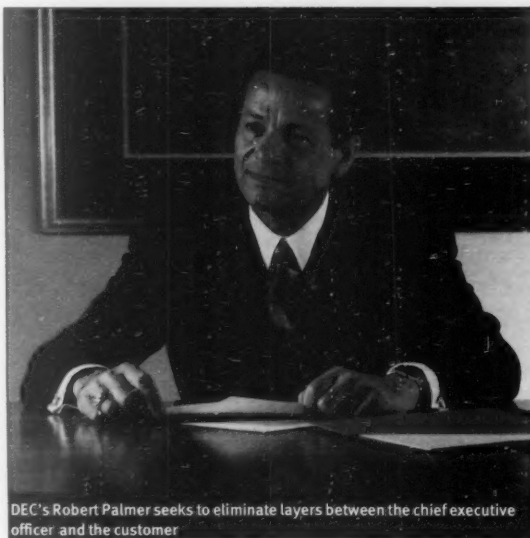
Q. The cuts you made in your software portfolio were less than many people expected. Will there be more?

A. I think more cuts are necessary. [I don't know what they'll be], but we will make sure whatever we do doesn't create undue difficulty for customers.

Q. You are targeting specific vertical markets. How do you reassure customers in markets you haven't identified as strategic?

A. All customers with a purchase order are important to me. But in internal investments, in some industries we will not have the same level of support as others. We have to get focused. In those we choose to participate in, we are in a leadership position.

Interview by Paul Gillin, *Computerworld's* executive editor. His MCI Mail address is 575-4120.



DEC's Robert Palmer seeks to eliminate layers between the chief executive officer and the customer

straight with customers?

A. Customers are not saying they want to buy an operating system; they say they have a problem to solve. We have the capability to support [multiple] operating systems. In the past, we were reluctant to get behind Unix, and that hurt us. We now intend to be a leader in open systems and in Unified Unix.

Q. How important to you is it to have a second source for Alpha?

A. It's important but not critical. Our objective is to establish this architecture as the standard, and that means you have to have availability. The semiconductor people will be hesitant to go into a major architecture unless they see broad market acceptance, and I think we're beginning to see that now. In the

announcement in the next few months.

Q. Why are you undertaking such an aggressive PC push when the margins are clearly shrinking in that business?

A. Most of our businesses these days are extremely competitive, so there's nothing different there. Our customers buy a lot of PCs, and if Digital's going to make any money in that sale, we have to design and manufacture those products ourselves. I would not want to become just a distributor of PCs because there are no margins in that. We want to become a manufacturer and distributor both. We also have the advantage of a worldwide service structure, which most of our competitors don't have. So, if you

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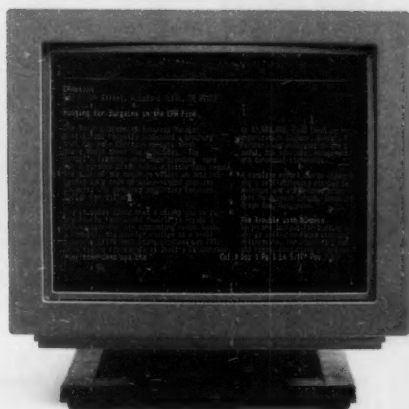
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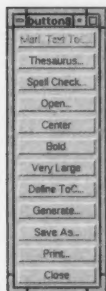
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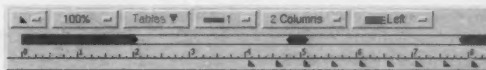
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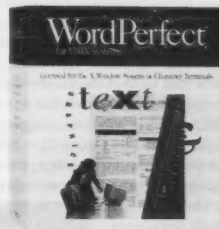


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No pain, no gain

There will be lots of grumbling in corporate boardrooms this week about the Clinton administration's plan to sock it to the wealthiest wage earners in the form of higher taxes and fewer deductions. But all things considered, I'd say the computer industry came through the president's tax package proposal in pretty good shape last week.

Although the Clinton plan will hit large corporations across the board, several provisions play to the strengths of the technology industry. Chief among them is the 7% investment tax credit. This on-again, off-again incentive, which was eliminated eight years ago, had been a major stimulus to corporate investments in computers and technology.

It should be particularly compelling this time around as the real estate crash and surplus plant capacity has muted some of the enthusiasm to invest in plants and equipment. This administration clearly believes that dollars spent on computers and communications is money well spent. Let's hope other incentives lay ahead.

The other bit of good news for start-up firms, in particular, is the provision for capital gains relief for investors who put money into small businesses for at least a five-year period. Entrepreneurism is the heart of high tech. Witness the fact that 15 of the Top 25 companies on *Inc.* magazine's 500 list are in the computer and communications fields. With the old line corporate giants reeling under the weight of their own bureaucracies, the time is right for investors and customers to look to smaller concerns. The Clinton package contains incentives to do exactly that.

The surtax on energy consumption won't win any popularity contests but should be a boon to sales of computerized products that can cut energy costs by 25% or more (not to mention energy-efficient "green PCs"). The package also preserves corporate R&D tax breaks and actually proposes modest increases in government spending on basic science research.

I may be reaching a bit in trying to find a silver lining here. In the short term, the incentives for high-tech investment won't offset the whack that major industry players will take from defense spending cuts or that the PC business will feel as higher personal taxes put the squeeze on home computer sales. But I have a hard time finding fault with a tax plan that penalizes multimillion-dollar executive bonuses in order to preserve the viability of small businesses.

We will all pay plenty to climb out of the deficit hole previous administrations and Congress have dug for us. But we should not do so at the expense of the technology innovation that still makes the U.S. the envy of the world. The Clinton tax plan is at least a start in investing in the future.

Paul Gillin
Paul Gillin, Executive editor



What's Next?

Jim Daly's article "Next to cool black box, push OS" [CW, Jan. 25] gives an excellent synopsis of the history and plans for Next. Unfortunately, it devotes only one paragraph to Cubbage's concise analysis of the Achilles' heel that continues to prevent Next from enjoying the success it might otherwise: Jobs' utter disregard of open systems standards.

As your editorial noted in the same issue: "Arrogance and smugness have no place in today's market." Jobs' approach to operating systems is nothing if not arrogant and smug.

This has been the main cause of the limited success of Next the hardware company and will guarantee that Next the software company is at best a niche player of little consequence. Actually, a more likely scenario is another palace coup in which those funding Next force Jobs to add X/Open compliance to his darling operating system.

I predict that Jobs at Apple developed the last successful proprietary operating system and that Jobs at Next will prove it (to have been the last).

George Pajart
West Vancouver,
British Columbia

Warning helped

I have read many letters to the editor in different publications, all with the same conclusion as Rob Rosenberger's [CW, Feb. 1], and

each time I wonder at the failure [of experts] to grasp this fact: The reason so few computers succumbed to the Michelangelo virus last March 6 was because of all the publicity and resulting protective measures taken.

I am an MIS manager, and we found Michelangelo on disks distributed by one of our software vendors, and it never made it to our local-area network. If we had not been prompted to scan disks and hard drives for viruses as a result of the "scare" of Michelangelo, it would surely have made it onto the network hard drives, and from there who knows where.

Not once have I seen any publication give credit to the scanning software available or to the warnings in trade journals, etc., as reasons why the impact of Michelangelo was so slight.

The 5 million [estimated] figure may have been potential targets of the virus. Without checking and scanning, it probably would have been an "actual" number.

Thank you and other publications for raising the warning flag for us; it saved us substantial grief.

Gary L. Allen
Bountiful, Utah

C++ is poor business choice

I disagree with Scott Koehler's commentary "The scoop on OOP" [CW, Feb. 8] because his analysis focuses on narrow technical concerns, not business issues. Modern businesses and organizations depend on software in every aspect of their operation.

This dependency defines the objectives of application develop-

ment groups: creating more reliable applications, doing so more quickly and rapidly modifying those applications in the face of evolving user needs.

C++ — Koehler's recommended object-oriented programming language — was designed around the question: How much object-oriented capability can I provide without any runtime performance cost?

While C++ is an excellent response to this question, its fundamental orientation on performance is irrelevant for a typical application developer. C++ applications are easily two to three times as hard to build as applications based on Smalltalk, Choreographer and other high-level object development tools. Except in systems programming tasks, the actual performance benefits of C++ are minor compared with its enormous development costs.

Corporate IS management needs to look at the business concerns, not the technology. The issue is how to make your organization more responsive to customer needs. C++ is a poor choice based on this criteria. I would urge members evaluating object technology to look beyond low-level performance issues and focus on real organizational needs.

Jeffrey Bonar
Pittsburgh

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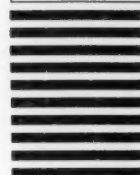
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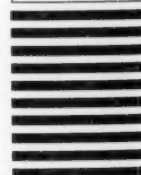
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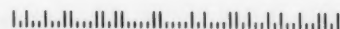
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Windows: Calling it awkward would be kind

Bruce J. Muckian

The large and increasing market share garnered by Microsoft's Windows is proof positive that P. T. Barnum knew what he was talking about when he said, "There's a sucker born every minute." An addendum to Barnum's statement might be "and many of them purchase computers and software for large corporations."

When is corporate computer management finally going to realize that forcing Windows on computer users is like making a secretary take dictation while holding a pencil with a pair of pliers and a notepad in a catcher's mitt?

Despite the programmed responses of cultists who sing the praises of Windows, I have never seen any evidence that it made my work with applications software any easier. Windows delays initial startup of application programs and then lies dormant, hogging precious memory until I have to get out of it for some reason or until it trashes my work because of some unexplainable Unidentified Application Error (UAE).

When I first heard about Windows, I was told it would contain the common I/O routines that most applications were duplicating. By reducing the number of I/O routines, printer fonts and other duplications of effort, Windows would supposedly reduce application program size and hardware requirements. Instead, what we find today is that Windows hogs up to



JAMIE GONZALEZ

10M bytes of hard disk storage and has caused applications programs to grow by a factor of two to four times their original DOS-based size.

Personally, I'd like to turn back the clock and go back to the more efficient days of DOS.

I'd rather have a stand-alone version of Microsoft's Excel running from my DOS prompt than have to wait for Windows to go through all of its memory-grabbing gyrations before I can even get near the Excel applications programs. That way, I'd also be able to make a nice clean exit back to the DOS prompt or my MENU system instead of being stalled by the Windows window, which I am required to close in no less

than three steps.

Adding new applications to the Windows environment is also a trial. Third-party software installation routines are almost never user-intuitive and require more than a rudimentary knowledge of computers.

Sometimes things just don't work the way they are supposed to. The user is then faced with the ubiquitous UAE, which seems to be Windows' response for 99% of all problems. By the way, there is no on-screen Help for a UAE. How could there be? Windows doesn't even know what the hell is going on.

I attribute the fact that Windows is still at the top of the charts in software sales to the same kind of dronelike thinking that used to cause corporate computing managers to recommend and purchase only IBM hardware, defending their choice by saying, "No one ever got fired for buying IBM."

They should have been fired! There were and are other systems on the market that are just as good, if not better, and a whole lot less expensive than IBM.

The same holds true for software — and especially for Windows.



Muckian is a systems analyst at The Boeing Co. in Seattle. He works with Windows 3.0.

If nothing on E-mail is private, just say so

OPEN MIND by Esther Dyson

Should you read your employees' mail? Your mother would say you shouldn't; it's not polite. The corporate controller might say you should so workers don't waste company resources. After all, they're at work; what do they expect?

That's the key question: "What do they expect?"

There has been a lot of discussion lately over electronic-mail privacy. Some of it involves important constitutional questions and interpretations of old laws in new media. But as far as workplace rights are concerned, the new technologies don't really change the old verities: Make the rules. Make them clear. And enforce them fairly.

Almost any policy is OK as long as it's clearly expressed, not just "understood." The vital thing is to make sure workers know the rules about E-mail, just as they know how long they can take for lunch and whether it is OK to use the phone for personal calls.

Most employees can live with a policy as long as it doesn't hit them as a surprise. On the other hand, it is embarrassing, degrading and unfair to have something you thought was private waved in front of you as evidence of malingering, insubordination or dishonesty. If someone knows her mail is open to inspection, she probably won't exchange embarrassing poetry, call the vice president of sales a pedantic idiot or send little notes for her kids to the family PC.

The fairest thing to do is to make sure that the limitations of E-mail privacy are spelled out from the start.

Some limitations are inherent. No company can guarantee complete E-mail privacy even if it wanted to. Personal E-mail could be read in error by a systems administrator, by someone legitimately borrowing a machine or by someone filling in when the user is sick. Other people may need to read an employee's mail for business reasons (and not just after you've left the company, as in the Borland/Symantec case). And

sometimes mail is misaddressed.

People with truly private or embarrassing mail of any kind are better off sending it from home — or perhaps not at all.

Then there is the need to safeguard other employees' rights. An individual who receives offensive or time-wasting mail from a persistent source has every right to forward it to management and ask for help in stopping the offender. That's not an invasion of the sender's privacy; the sender's behavior is an invasion

of the receiver's privacy.

Even if you, as a manager, promise to keep E-mail private (or as private as possible) you can still impose and enforce rules governing the use of company time and money. In principle, employees are free citizens and have the right to send mail to anyone they want. On the other hand, workers who waste people's time (after being warned) don't necessarily have a right to keep their jobs.

Again, it's more a question of judgment than of rights.

What if employees don't like the rules? What if you, as the person who has to enforce policies, don't agree with them? You have a choice: Compromise or leave. Jobs that involve principles sometimes require sacrifices.

In our private lives, where we are not (realistically) free to choose, we should be able to be free from surveillance — either by our company or by the government. On the job, however, all an employer really owes an employee is a clear statement of what's private and what's not.



Dyson is editor of "Release 1.0" and "Rel-EAST," newsletters on new technology and new computer markets in Eastern Europe.

Commentary

Charles Babcock

A barrier crumbles

Proven, useful Unix concepts seldom make it across the barriers of chemistry and culture into the world of PC software developers. Like oil and water, these two communities tend not to mix.

This tradition of standoffishness makes it all the more surprising to find a key concept of Unix—the flexible network “socket”—being adopted on behalf of PC Windows applications.

The Windows Socket Application Programming Interface, or WinSoc API, will

make it easier for Windows applications to connect to other PCs, Unix workstations and servers. It will give Windows users access to many variations of TCP/IP networks, the fastest growing way for interconnecting different computers.

The making of sockets for Windows



was a case of quiet collaboration. The concept was first proposed by JSB Corp.'s Martin Hall at the Interop '91 show in San Jose, Calif.

JSB is a supplier of windowing interfaces to Unix machines, and Hall pointed out that without a common specification for networking Windows applications, a variety of TCP/IP products would flood the field.

Four or five varied approaches already characterize the TCP/IP implementations for Unix workstations and DEC's VAX, but the problem is being compounded by sheer numbers in an expanding PC market. An estimated two dozen implementations already exist for PCs. That number could easily double as TCP/IP, which has earned its stripes on the Internet, becomes the protocol of choice for linking PCs to dissimilar machines or to networks beyond the PC LAN.

By 1997, 23% of PCs will be attached to a TCP/IP network, according to International Data Corp.

In this context, the significance of the WinSoc API is hard to overestimate.

When a Unix application needs to access the network, it calls on the operating system to create a socket. The socket is generated using variables that match the needs of the application to the network protocol stack. This approach gives the user independence from a brand-specific network. But to gain this flexibility, the operating system relies on calls to underlying libraries that invoke vendor-specific procedures.

Under Windows, the Dynamic Link Library (DLL), called from a file on disk, contains the procedures, and without a WinSoc API, vendors would have to compose DLL-tapped procedures as each saw fit.

Group result

The working group for the WinSoc API produced a 140-page specification, available to all, that outlines what each DLL procedure should be.

In addition to JSB, the group was drawn from FTP Software, which supplies TCP/IP products for PCs; SunSelect, which supplies Sun Microsystems' Network File System for PCs; and Microsoft. Communicating over the Internet, members hammered out Version 1.0 of the specification, which was subjected to a stress test last October.

Now, after some additional changes, Version 1.1 has been published and may be used as the basis for commercial TCP/IP implementations.

Instead of struggling to stay abreast of TCP/IP variations, Windows developers can compete on function and features, adding value to their applications. Users can plug into their TCP/IP networks without worrying about whether a particular application happens to work with their TCP/IP network.

It makes you wonder why the PC and Unix development communities don't get together more often. Maybe they could even start to heed each other's best ideas.

Babcock is *Computerworld's* technical editor. His MCI Mail address is 575-2737.

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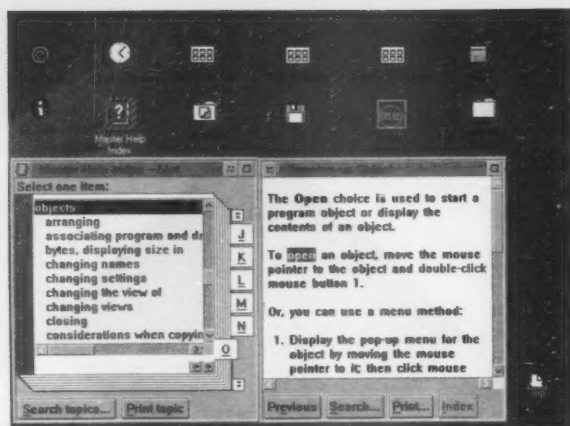
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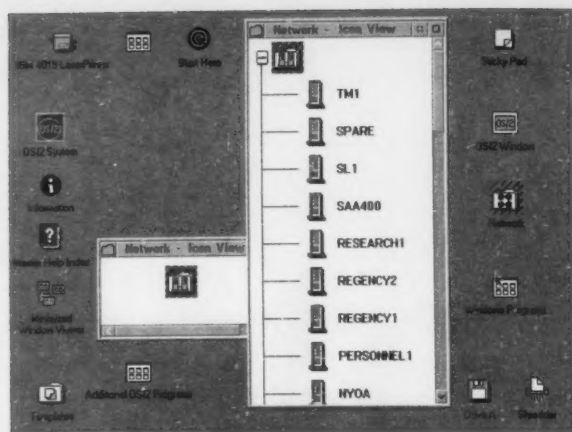
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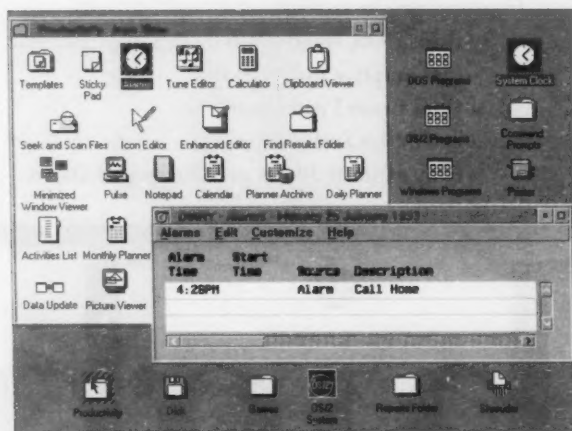
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Desktop Computing

User Voices

Managing the mishmash

Question: What is your strategy for managing/supporting multiple personal productivity applications throughout your company?



>JOHN TRAENDLY, a group director of Ryder technology at Ryder System, Inc. in Miami. The approach we are taking is to try to establish standards

that still leave users with some options. We need to provide broad support, and you really can't do that unless you at least have some defined set of software. In addition, those standard applications have to exist with the applications we are developing and work together successfully.

One way we address that is that we hook internally developed software into WordPerfect to produce customer proposals.

In addition, we are strongly encouraging everyone to move to Windows. We just purchased a suite of integrated applications — Microsoft Office — and we will encourage its use because of the price advantage and its high level of integration.

(Editor's note: Microsoft Corp.'s Microsoft Office integrates the Excel spreadsheet, Microsoft Word word processing, the Microsoft graphics package and a one-node license for Microsoft Mail.)

We are trying to decentralize the process so users can get what they need quickly, but we give users buying/integration guidelines, such as through the PC guide we have published. Long term, some uniformity will reduce the training costs. If you don't have some standardization, training would become unmanageable.

>ROBERT HECHT, vice president of investment systems at Prudential Investment Corp. in Newark, N.J. Our focus is determining the cost of doing something in a standardized way vs. giving people a great deal of flexibility. You could take a path with a certain spreadsheet and find that the cost of changing the user's software — even if

it's better — may not really be cost-beneficial in terms of training costs.

We make a recommendation that we find has worked for the majority of our customers. We have about 25 to 30 applications on Windows, and as the business drivers warrant, we migrate people to a Windows environment.

We cannot dictate which application a user will run, but they do have to present a business-driven case. We have to support the package, we have to put it on the LAN, and we have to make sure it works properly.

So, we charge back everything that we do. If somebody wants something that we don't have out there, we will give them a cost and they will be charged.



>JOHN CHAMBERLIN, PC coordinator at British Petroleum Oil Co. in Ferndale, Wash.

We originally had separate groups of applications for advanced users and for novice users. Then Windows came in and, at the time, people brought in various Windows applications.

So, things went from pretty good to kind of bad to awful.

About six months ago, we came out with a strong standards statement, and approximately 50% of our people responded to it.

And in the last six months, the other 50% have started coming around because they've realized they can't share their work without the standard software.

For me, this is much easier to support, and for users, the gates are open for teamwork.

>JUDE GARTLAND, senior vice president at Lehman Brothers in New York.

We have set up numerous committees to look at ideas for standardizing applications.

We are differentiating strongly between developers and users.

We feel that we should take a much

harder stance with developers, whereas with end users, it's much harder to set standards.

"Enforcement" is a word we will use with developers; some things we choose will become mandatory for them.

If we choose the Borland compiler, for example, we will enforce that pretty strictly.

End users will have less defined standards.

For the people going forward and making a shift to Windows, that's a marvelous time to try to help them switch. But you can't force someone to give up an application they've been using.

The least we want to do is put a burden of proof on users — to require that they make a strong business case if they want something nonstandard.

Standardization would help users in workgroups because they would be working with the same packages.

Then there are the economics. You can cut a better deal with one spreadsheet vendor for many licenses instead of four different vendors.

I think there are going to be a lot of voices in this process. It's more the committees who will make the decisions. It won't be IS.



>JOHN ROBERTS, vice president of computer services at Unum Corp. in Portland, Maine. We are trying to focus on a desktop environment that's

consistent, so we've rolled out Microsoft Office.

We are upgrading managers in the application development area all over the corporation. What we are finding is that while you may use one application, you are familiar with about 80% of the others. This is really proving to be a good investment.

My experience is that moving from character-based to graphical-based applications is about all the incentive you need.

We approved Windows 3.1 and then a tool set for it. Windows 3.1 is the supported graphical standard. We don't push people, but it is the only one supported. That is how you help people move.

We are not just moving everybody en masse.

Responses compiled by senior editor Rosemary Cafasso. Comments have been edited slightly for clarity.

High-tech firms form customer support initiative

By James Dalry

Overloaded technical support lines have become a sore point for a high-tech industry that once prided itself on the image of being simple and foolproof. Confusing manuals, endless busy signals and callbacks that sometimes take days are common and frustrating to users, as well as vendors.

What's being done? In recent weeks, 19 high-tech companies have formed the Customer Support Consortium to compare notes and come up with some way to untangle the problem-solving business. The development project is ultimately expected to produce a set of software tools and applications that it vows to pass on to the user community.

The consortium grew from a simple strength-in-numbers idea. "All of the vendor community is facing the same support problems, and we can't resolve them on our own," said Craig Chelius, consortium director and vice president at member company Symbolic Corp. "We've got to help each other out."

The job of providing adequate support to the growing number of users facing

the daunting challenge of moving to client/server environments has pushed many vendors to the breaking point. "Every organization is faced with the paradox of supplying better quality and improved timeliness of customer support while at the same time, demand grows," said Robert Haubner, customer support manager at member company Intel Corp.

Support problems affect everyone from the small to the tall. In a highly publicized internal memo that was leaked to the press more than a year ago, Microsoft Corp. Chairman Bill Gates complained: "It is really embarrassing that people have to wait so long on the phone to talk with us about problems in our products. . . . The number of customers who get a bad impression because of this must number in the millions worldwide," Gates said.

The consortium's plans call for the development of an open client/server application known as a "product knowledge management system." It will be designed to supply instant information about what went wrong, why and how to fix it. The

Customer support, page 40



In the "User Voices" column rotating throughout our technical sections, Computerworld shares user opinions solicited at random on computer-related issues. This week, users speak out on their efforts to integrate and support disparate personal productivity applications corporatewide.

Spotlight on multimedia, comm at Demo '93

Products include tools to update PCs, scanning software for Windows

By Christopher Lindquist
INDIAN WELLS, CALIF.

This year's Demo show once again highlighted products that have the potential to open up new segments of the computer industry.

The emphasis this year was on multimedia and products — both available and not yet available — intended to enhance business communications via the PC.

Featured products included technology from Burlington, Mass.-based Water-

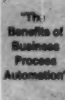
mark Software Corp. that allows scanned images to be appended to a Microsoft Corp. Windows application that supports Object Linking and Embedding, including databases. The software also allows the images to be appended with a variety of highlighting tools.

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The introductory version, Watermark Discovery Edition, is slated for availability in April, and the Pro Edition is due in the third quarter. The Discovery Edition is aimed at small groups of up to 100 people who want to try image-enabled applications. The Pro Edition will contain optical character recognition of scanned documents.

Also featured were a variety of tools designed to help get information into a PC and keep it updated. Among the participants was Smartsync for Windows, a product planned by Nomadic Systems, Inc. in Mountain View, Calif. Using Smartsync, users would reportedly be able to keep files on multiple machines continuously updated to maintain data integrity on, for example, an office PC and a laptop.

Kiva conferencing

A more real-time use for connected PCs was demonstrated by Tucson, Ariz.-based Artisoft, Inc. Called Kiva and due for release in the first quarter of 1994, the product allows for conferencing over a network. According to the company, the network acts as an electronic conference room in which participants take part in rules-based meetings.

The advantages over a traditional meeting, according to the firm, include the ability to keep extremely accurate notes and provide anonymity to the participants. Long-range plans for the product include the ability to teleconference.

On a more personal level, San Diego-based Octus, Inc. demonstrated Octus1, a system that allows information from phone calls, including caller identification, fax sending and retrieval and digital signals such as voice to be stored in a personal information manager.

Customer support initiative formed

CONTINUED FROM PAGE 39

system now under development includes software tools and applications that will automate the acquisition, management and use of large and complex bodies of product knowledge.

The package will then be distributed to corporate help desks, systems integrators, value-added resellers and strategic business partners, Chelius said. He acknowledged that "a lot of work still needs to go into it," and he predicted that the consortium's first package will be available by next year.

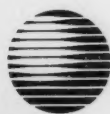
The system will also be designed to use intelligent retrieval technologies to increase the speed, ease and accuracy of answering customer support calls, Chelius added.

Member companies said they are anxious to address support problems immediately and effectively and will not hesitate to offer tips and tricks that have worked for them. "We're committed to exchanging ideas, techniques and tools," said Bert Forniciari, vice president of Silicon Graphics, Inc.'s Customer Support Division.

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IBM Japan's outlook on the future of PCs

Nobuo Mii, general manager of IBM's Entry Systems Technology business unit, was tapped in 1991 from the company's Japanese subsidiary to head development of PC technologies three to five years into the future.

Cambridge, Mass.-based writer Lori Valigra recently interviewed Mii on the future of PC development.

Q: You've worked on both sides of the Pacific. Is there any difference in research and development investment strategy in the U.S. vs. in Japan?

A: Some people say the Japanese are long-range and the U.S. is short-range, but it's not true. IBM is spending a lot of money

for the long term in the U.S. The key difference is that the decision process is much shorter and easier in a Japanese company. Japanese companies are not that loyal to stockholders; they don't worry so much about what the dividend should



IBM's Nobuo Mii: 'In the very early stages ... maybe a closed system works more effectively'

be. In the U.S., we need a lot of studies for long-range strategic investment. Sometimes, technically, something is needed, but it's not affordable because IBM is responsible to stockholders.

Q: IBM has been focusing on joint ventures. Are strategic alliances becoming necessary to advance PC technology?

A: New technology itself needs a much more huge investment now, beyond the one-company size. IBM's total \$6 billion R&D budget (net spending) is bigger than the national budget of some countries.

The U.S., Japan and Europe are now getting smarter. Why do it by yourself? Why not build a strategic alliance? That type of collaboration will become more frequent.

We need a lot of high technology even for LCDs, new disk drives, new silicon and fiber optics to make a small laptop.

Q: What are some of your alliances for future IBM PCs?

A: We are now in an alliance with Toshiba for small, flash memories as well as flat displays. And with Siemens and Toshiba, we formed an alliance for next-generation dynamic random-access memory chips.

Q: Keeping technology proprietary seems to be almost a natural reflex for corporations. How can that work in an international setting?

A: My philosophy is that in the very early stages of new engineering and technology, maybe a closed system works more effectively. I don't think it's wrong because the technology is not mature yet. We can concentrate and do not have to listen to public opinion.

But you need some level of saturation

when new technology becomes a commodity business. At that time, it should become open so everyone can use it. That's the only way to reduce costs.

We need to be very strategically smart about when we close, open and then once again close the technology. Even five years ago we still believed the PC was the IBM crown jewel, but now everyone wants this

kind of function.

We are a business; we spend a lot of money on investment. At some time, if we don't open up, that market is not expanded.

Q: Isn't it still important for a company to be the originator of technology?

A: License income is very important to us. Technical origin is important. I don't care

who built it — made in China, made in Taiwan, made in Hong Kong. I only care that if you build this, how much percentage do I get because I am the origin agent.

IBM is enjoying good sales of technology — my license fee for IBM technology to the outside in 1992 is over \$100 million worldwide for PCs only. We license the basic I/O system to Matsushita, for example.

Technology has a global market. We can sell products, but my license business is IBM.

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*E. E. Goodmaster
Director, Management Information
Chesebrough-Pond's USA*



New Products

Peripherals

Maxtor Corp. has started shipping the Maxtor 7245.

According to the company, the product is a 240M-class, 1-in.-high, 3 1/2-in. disk drive that has 245M bytes of formatted capacity.

Designed for PCs, file servers and

workstations, the Maxtor 7245 has an average seek time of 15 msec. Its track-to-track seek time is 3 msec.

Available with either an IBM Personal Computer AT or Small Computer Systems Interface (SCSI) controller interface, the Maxtor 7245 has buffer transfer rates of 9M byte/sec. for the AT interface and 10M byte/sec. for the SCSI fast interface.

Evaluation unit pricing for either interface is \$395.

► **Maxtor**
211 River Oaks Pkwy.
San Jose, Calif. 95134
(408) 432-1700

Lexmark International, Inc., a former division of IBM, has introduced the IBM 4029 Print Accelerator/600.

According to the company, the product is a Microsoft Corp. Windows-based print accelerator that speeds up 600-dot/in. printing, making it up to eight times fast-

er, while using two-thirds less printing memory than its competition.

Graphics-intensive printing with 3M bytes of printer memory is available for the Windows accelerator and the recently announced IBM 4029 OS/2 driver by using advanced memory management techniques and the processing power of host PCs for formatting jobs, the company said.

The enhancements are provided at no additional charge on Models 6, 6P, 10L and 10P on the IBM 4029 line and on the IBM LaserPrinter 10, according to the company.

An upgrade kit of the current IBM 4029 LaserPrinter costs \$59.

► **Lexmark International**
740 New Circle Road
Lexington, Ky. 40511
(606) 232-2000

DynaPoint, Inc. has released DynaTrak, a trackball for laptop, notebook and sub-notebook computers.

DynaTrak has a "breakaway" design that averts damage to the trackball or computer if it is suddenly bumped, the company reported.

Left- and right-handed users can work with the product because it offers a swiveling two-button control.

DynaTrak is 100% Microsoft Corp. Windows-compatible and is available in both a serial port version for all IBM compatibles that have serial ports and a Personal System/2 version, the company said.

DynaTrak costs \$69.95.

► **DynaPoint**
1016-B Lawson St.
City of Industry, Calif. 91748
(818) 854-6440

Sigma Designs, Inc. has introduced ColorMax 20T, a high-quality, 20-in. Trinitron monitor.

The ColorMax 20T has a dual-pitch display with unlimited colors and a viewing resolution of 1,024 pixels by 768 pixels with a 75Hz vertical refresh rate.

The product can operate with Apple Computer, Inc. Macintosh graphics display adapters, and it can be used in multimedia applications, graphics design and desktop publishing environments. ColorMax 20T is part of Sigma Designs' ErgoView family of displays, providing a low-emission technology design.

ColorMax 20T costs \$2,499.

► **Sigma Designs**
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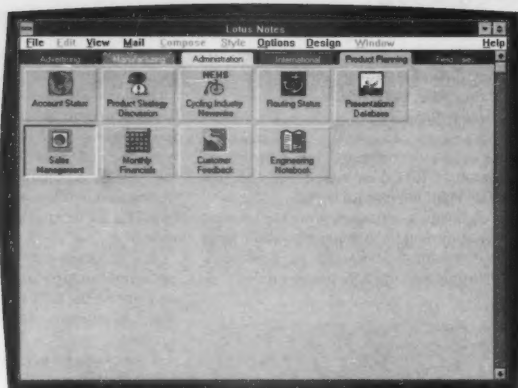


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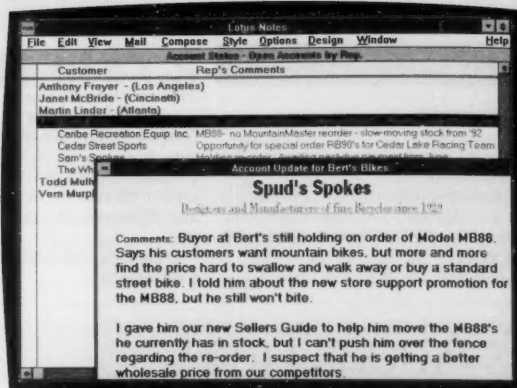
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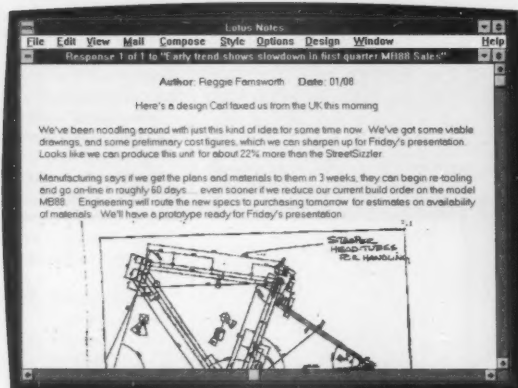




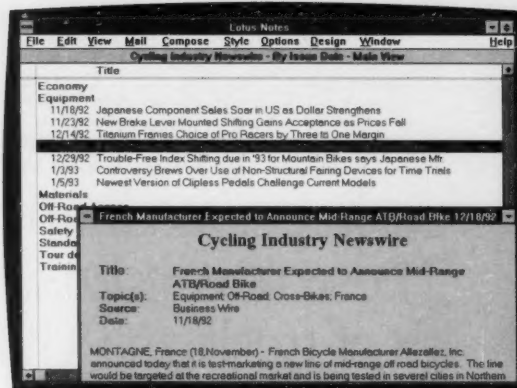
1. This is Michelle's Notes desktop. Each icon represents a different Notes application. She uses these to work with people all over the world including the field sales team, manufacturing, engineering, R&D, key customers and senior management. She regularly scans activities in the field by double clicking on ACCOUNT STATUS.



2. Today, she notices a number of entries regarding a slow-down in closing first quarter reorders for their most popular model, the MountainMaster off-road bike. It seems the market for this high-priced bike is beginning to dry up. This could be a major problem.



5. The next morning she checks into the DISCUSSION database and this time finds an entry from Reggie in R&D. Reggie had also read Jim's message and is responding with a possible solution his people have been playing with. He pastes in an autocad illustration faxed to him from the U.K. using a Notes incoming fax gateway.



6. With a presentation on Friday, Michelle gets down to some quick market research by opening up the CYCLING INDUSTRY NEWS database. An organized source of live industry data, it provides a news report on a French company that has a couple months head start developing a hybrid bike.

To see how fast you Lotus Notes, just watc

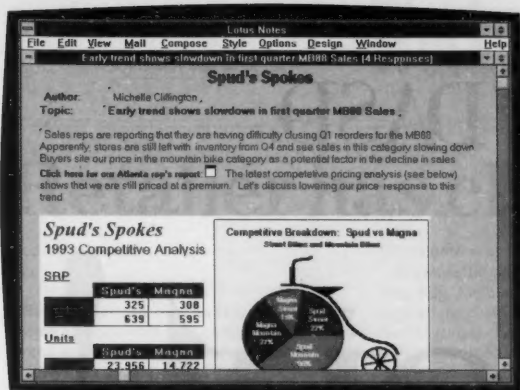
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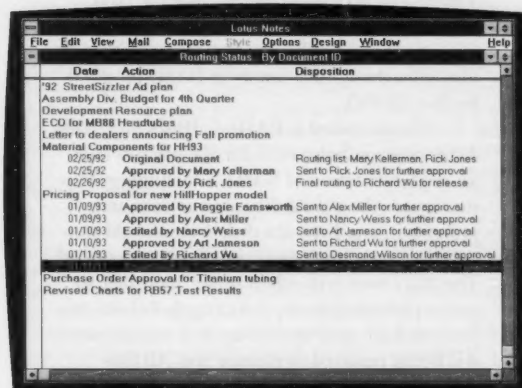


Michelle Clifftington is a product manager for a bicycle manufacturer. She's responsible for all product planning, market research and marketing activities for her product line. Notes helps her shift gears and rush a new product to market.

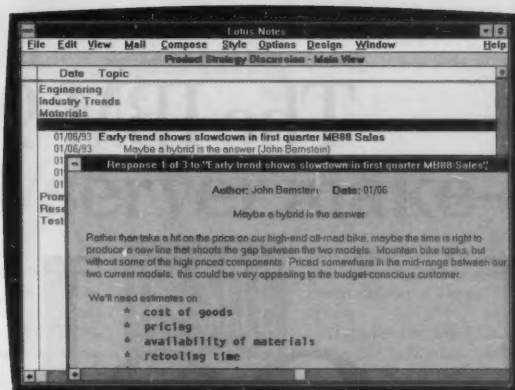
See how she accesses, tracks, shares and organizes information in ways never before possible. How



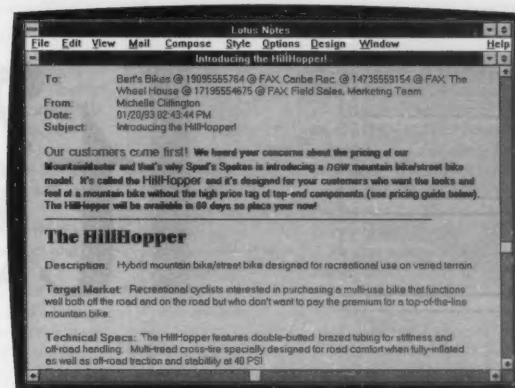
3. She decides to recommend a price-reduction and double clicks into the STRATEGIC PRODUCT DISCUSSION database. This provides an organization-wide forum to discuss issues and brainstorm solutions. She links the report from the Atlanta rep directly into her Notes document. Then she uses DDE to embed some 1-2-3[®] charts into her document as well.



7. A few days after routing her proposal to the product team, she wants to find out where it stands within the organization. She opens the ROUTING STATUS application to find that it has worked its way through the organization to Desmond, the senior decision-maker, and has been finally approved. So she's on her way.



4. Later in the day she re-enters the DISCUSSION database looking for responses. Her boss, John, has logged on from his hotel room in San Francisco. Rather than cut the margin, he suggests she explore the feasibility of adding a mid-priced bike to their line. He wants an initial presentation for Friday.



8. Michelle closes the loop by communicating the news to their customers. Double clicking into the CUSTOMER FEEDBACK database, she faxes a memo directly from Notes to all retailers. In it she explains that the company has heard their problems and responded with the Hill Hopper. And with delivery in 60 days, they can order now.

can respond with h Michelle shift gears.

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Retailer has client/server make-over

By Jean S. Bozman
DALLAS

■ **Retailer Neiman Marcus is outfitting its 27 stores and two warehouses nationwide with a brand-new set of client/server systems that will record crucial point-of-sale (POS) data on a server within each store and on a host.**

The 20-month make-over is expected to boost sales-force productivity because it will capture vital customer data at the time of purchase. That reduces paperwork and helps generate more sales through directed marketing.

The client/server systems replace thousands of decade-old POS terminals with Intel Corp. 386-based IBM PCs that double as cash registers and data-entry points for a centralized relational database system. The firm is running the The ASK Group, Inc.'s Ingres 6.3 database on IBM RISC System/6000s at each store and at a central site at its headquarters here.

Change for users

By the time the chainwide conversion is completed later this year, it will have changed the daily work routines of 15,000 salespeople. Most sales associates used to record all commission sales with ink in their own "clientele books." The new sales system automates the record-keeping and updates a personal database for each sales associate that is stored in the

RS/6000 store server.

Because the sales information is also stored centrally, Neiman Marcus will gain new insights into customer spending patterns, said Keiffer Buggs, the firm's manager of credit, finance and administrative systems. "Each time a sale is made, one update is made in the sales associate's database and another is made in the repository, which is uploaded to the [IBM mainframe] host," Buggs said. The mainframe runs a centrally managed commission system and sales audit system, he added.

Productivity gains are expected because sales personnel will have less paperwork, and they will be able to alert customers when favored brands of merchandise arrive at the store.

"I used to get bogged down in recording all of my customers' purchases in my clientele book," said Greg Lim, a senior sales associate at the North Park store in Dallas. "Now, we build our customer list daily, and we always have that information available." Lim accesses his sales database from his sales department's PC cash register.

There was some resistance, however, to the changeover from the old cash registers and paper records.

"Some thought nothing was as good as their tried-and-true client book," Lim said. "But the software makes it easier for us to carry out the transactions, and it prompts us to do things

ON SITE

Neiman Marcus
Irving, Texas

Mission: To replace all of its systems with intelligent PCs and sales databases and move to client/server architecture.

Users: 15,000.

Hardware: RS/6000 servers; PC/cash registers.

Software: IBM AIX on servers; ASK's Ingres relational database on each server; IBM PC-DOS running on Intel 386-based IBM PC/cash registers.

that used to be written in manuals." For example, Lim said, the new system supports on-line credit authorization and lists out-of-state sales taxes.

Training for any given sales department takes one day, but several days are needed to train 500 sales personnel in a large store, Buggs said. The conversion to the new store systems takes a week, during which time up to 130 POS terminals are replaced and technicians install an RS/6000 server linked to multiple IBM Token Ring local-area networks.

Hardware maintenance costs have dropped since moving to the new systems because the aging POS terminals required frequent repairs. The PC-based cash registers use IBM's PC-DOS operating system to conserve on-board memory that would be used up by graphical user interfaces, Buggs said. Ingres 6.3 was chosen for its fourth-generation language, performance and backup-and-recovery utilities, he said.

Buggs said the client/server systems were developed by a project team of 15 people during a period of two years. The team included programmers, database experts, telecommunications specialists and support personnel.

So far, seven Neiman Marcus stores have made the transition to client/server operations, including two Dallas stores and stores in Atlanta; Beverly Hills, Calif.; Denver; Scottsdale, Ariz.; and Troy, Mich. The remaining 20 are scheduled for conversion by year's end.

Token Ring faces barrage of tests

By Lynda Radosevich

Forces are gathering in the 16M bit/sec. Token Ring world to ensure that vendors' hubs and adapters interoperate well over unshielded twisted-pair cabling.

A consortium of vendors including Proteon, Inc. began testing last week at the University of New Hampshire Interoperability Lab in Durham, N.H. A similar group led by Synoptics Communications, Inc. began testing in December. Meanwhile, the Institute of Electrical and Electronics Engineers, Inc. 802.5 committee, which sets Token Ring standards, will continue work next month on developing standards for 16M bit/sec. Token Ring over unshielded twisted pair.

The goal is to allow users to mix and match Token Ring products

from multiple vendors on inexpensive unshielded twisted pair, a move that could help drive Token Ring prices down more.

"It will only have a positive effect if different vendors can assure that their products work together," said Chip Pettitrossi, local-area network research analyst at International Data Corp. in Framingham, Mass. "That will stimulate price competition. Vendors

won't be able to differentiate themselves as much, and that lowers the price curve."

Now, mixing vendors' 16M bit/sec. Token Ring products can cause problems because the standard for 16M bit/sec. Token Ring over unshielded twisted pair is not yet in place.

"Essentially, the issue in Token Ring is the problem of jitter," especially in 16M bit/sec. over unshield-

ed twisted pair, according to Barry Reinhold, director of the Interoperability Lab. Jitter is distortion that happens when the signal gets out of synch, he explained. "It exists in all environments to some extent, but clearly there is more potential in heterogeneous environments."

The result of high levels of jitter is that the user sees more and more errors, and in some cases, the ring can stop functioning. It can be caused by slight variation in how vendors handle the addressing protocols and is especially pronounced in Token Ring networks because data packets travel from station to station, causing a cumulative effect. Once the problems are identified, however, they are easy to fix, Reinhold said.

De facto standard

At the Synoptics Token Ring Interoperability Lab in Santa Clara, Calif., IBM equipment is being set up as the de facto standard, and members' equipment is introduced into the IBM environment. The lab is looking at frame error rate testing in a variety of configurations, said Carol Weinreich, manager of the lab.

Guaranteed Token Ring com-

patibility would allow organizations such as the American Cancer Society to rethink their purchasing strategy.

To avoid problems, the Cancer Society has standardized on 16M bit/sec. products from IBM, which owns between 70% and 80% of the Token Ring market, according to analysts.

"We found that standardization reduces support costs," said Kyle Cooper, senior technical analyst at the society's national information systems headquarters in Austin, Texas. "We don't want to run into support issues because of some bogus Token Ring board we bought from a yahoo vendor."

However, "if they guaranteed perfect interoperability with [IBM's] Communication Manager, in our case, and had significantly reduced the cost, we'd have to look at it," Cooper said.

The Inland Steel Co. in East Chicago, Ill., uses IBM 16M bit/sec. Token Ring bridges and adapters in its 35 LANs, but "that might change because of price," said LAN manager George Bosnich. "Personally, I would jump on a vendor like Proteon that guarantees that if there is a [compatibility] problem, it's their problem."

Falling prices

Even without the price competition expected with guaranteed compatibility, Token Ring prices are dropping. Vendors that have recently announced price cuts include the following:

• **Thomas-Conrad**, which dropped prices on its 16/4M bit/sec. Extended Industry Standard Architecture and Micro Channel adapter from \$675 to \$599.
• **Standard Microsystems Corp.**, which reduced prices on the same configuration adapter from \$599 to \$325 for a limited time with a trade-in of any manufacturer's 4M bit/sec. Token Ring card.



PC package may tighten network security

By James Daly
SANTA CLARA, CALIF.

Connecting two or more PCs has two basic implications for security: You have more to lose and more ways to lose it. Systems administrators know, however, that the number of networked PCs is pro-

jected to rise rapidly during the next few years, and they are scrambling for ways to get their arms around the security risks inherent in intercomputer communications.

One recently introduced assistant from Semaphore Communications Corp. is the Network Security System (NSS), a

hardware and software package that controls network access and encrypts data as it travels from source to destination over both local- and wide-area networks.

NSS is a platform- and protocol-independent tool wherein sensitive data is encrypted at the source and remains pro-

TECTED until it reaches its destination, according to Semaphore President Charles J. Hart.

The package consists of two primary components: the Network Security Center (NSC) and the Network Encryption Unit (NEU).

Administrator's focal point

The NSC is an application that serves as the network administrator's focal point, providing him with a variety of security controls that are accessible through a graphical user interface, pull-down menus and mouse control.

The administrator can also create customized security sequences that are tailored to an organization's specific data protection needs, Hart said.

The NEU is a reduced instruction set computing-based hardware component that resides between one or more network nodes and the network itself.

Its duties are many, including encryption, authentication to detect masquerade threats, access control to prevent unauthorized resource use and data integrity to detect data modification attempts. It uses both the Data Encryption Standard, a government-approved algorithm for encrypting digital information, as well as RSA Data Security, Inc.'s public-key encryption algorithm.

Individual estimates vary, but experts generally predict a 40% annual growth rate for PC networking during the next several years.

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Numerous entry points

Network security presents a particularly dodgy problem for security administrators. Information that is transmitted across a network is available to all nodes in the transmission path, such as PCs, workstations, printers, mainframes, file servers or other devices, and not just the intended recipient. Each node can thus access any resource on the network.

These operating characteristics make the network vulnerable to unauthorized use, data modification or disclosure. While physical security measures may be adequate for small, local workgroups, this limited form of security is no longer effective when data is transmitted across enterprisewide networks.

Semaphore hopes that NSS, which starts at \$3,500 for a 16-node setup, will remedy those problems by rendering the data unreadable. The system was designed with current and future WAN technologies, including X.25, frame relay, Asynchronous Transfer Mode and Switched Multimegabit Data Service, Hart said. Products currently available were designed for use on IEEE 802.3 and Ethernet networks.

Semaphore is a Xerox Technology Ventures company and was formerly known as Advanced Encryption Systems.

FileNet unveils two IBM RISC-based servers

FileNet Corp., an imaging company, has announced Model 6220 and Model 6580, two servers based on the IBM RISC System/6000 reduced instruction set computer. As part of the company's Series 6000 family, the models consist of an entry-level desktop server (6220) and a high-performance, multitasking tower server (6580).

The Model 6220 houses a 3½-in., 1-G-byte magnetic disk drive, a 3½-in., 2.88-M-byte disk drive, a ¼-in., 525-M-byte tape drive, 32M bytes of system memory, a 33-MHz RISC processor and an Ethernet or Token Ring adapter. Peripheral Device Cabinets enable the 6220 to support up to 5G bytes of external disk capacity, the company said.

The Model 6580 comprises a 1.44M-byte disk drive; two 3½-in., 1G-byte magnetic disk drives, which are expandable to 6G bytes; 64M bytes of system memory; and a 62.5-MHz RISC processor. Support is provided for a high-capacity 5G-byte, 8mm tape drive and a CD-ROM drive. When using Peripheral Device Cabinets, up to 30G bytes of external disk capacity is also supported.

Under AIX/6000 Version 3.2, the Series 6000 servers support departmental, workgroup and enterprisewide applications with workstations that run WorkFlo software and imaging applications on Ethernet and Token Ring local-area networks, according to the company.

Shipment is scheduled to commence next month, with prices starting at \$14,400 for the Model 6220 and \$85,000 for the Model 6580.

► **FileNet**
3565 Harbor Blvd.
Costa Mesa, Calif. 92626
(714) 966-3400

Unix

Accelr8 Technology Corp. has released Open RMS, a file system implemented on Unix.

According to the company, the product was patterned after the RMS file system on Digital Equipment Corp.'s VAX/VMS computers. VAX RMS facilities, including Open, Create, Put, Get, Update and Close, are implemented, functioning with relative, indexed and sequential files. RMS structures such as FAB, NAM, RAB, XAB-

KEY and XABPRO are supported for manipulation and file access.

The product is currently available for DEC's reduced instruction set computing (RISC) systems as well as Sun Microsystems, Inc., Hewlett-Packard Co., IBM RISC System/6000 and Silicon Graphics, Inc. systems.

Prices start at \$3,988.

► **Accelr8 Technology**
Suite 108303
East 17th Ave

Denver, Colo. 80203
(303) 863-8088

Woodside Technologies, Inc. has announced Fortress, a graphical user interface-based security program with antivirus protection for Unix.

Working with an intuitive point-and-click interface, users can explore and monitor system security risks, including viruses, worms, weak passwords and Trojan horses. The Trojan Horse Detec-

tor, the Worm-Proof, the File Inoculator and The Password Cracker are Fortress' four modules.

The product is available for Sun Microsystems, Inc. Sun4 and SPARCstation hardware, the SunOS 4.1+ operating system and Versions 2.0 and 3.0 of Open Windows. Fortress costs \$495.

► **Woodside Technologies**
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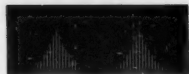
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CISCO SYSTEMS

Network niche players take stand at ComNet

By Elisabeth Horwitt
WASHINGTON, D.C.

Several small but feisty network management vendors popped up at the recent Communication Networks Conference and Exposition show to say they are alive and well and enhancing their products' appeal to potential customers.

Companies such as Objective Systems Integrators (NetExpert), Maxm Systems Corp. (Maxm), Boole & Babbage, Inc. (Net/Command) and Nynex Corp. (Allink) specialize in tools for managing a mixed batch of legacy networking systems that often do not support standards such as Simple Network Management Protocol (SNMP), according to Jeremy Frank, vice president of Gartner Group, Inc.'s Networked Systems Management Service. This makes such products a potentially great fit with the leading integrated network management packages such as IBM's NetView and Hewlett-Packard Co.'s OpenView, Frank added.

Unfortunately, such systems have failed to attract huge user bases, at least partly because of their large price tags — typically around \$200,000.

In addition, such systems tend to be a set of tools, rather than a plug-and-play system. Because most leading multivendor network management systems share this limitation, a vendor's ability to provide full support and integration services becomes crucial to success in the market, Frank pointed out.

Indeed, one of the main reasons United Parcel Service, Inc. recently picked Novell, Inc.'s NetWare Management System from about 50 competitors was Novell's willingness to work side by side with the information systems department to put the system together, according to UPS telecommunications manager Marc Dodge [CW, Feb. 15].

Name of the game: Usability

Price cuts, greater ease of use and expanded support were the focus of recent announcements from the niche network management players. They included the following:

- Nynex said it has introduced a tiered pricing structure for its Allink Operations Coordinator to make it affordable to customers that have smaller networks with fewer types of devices, a company spokesman said. Allink interfaces with local-area networks, T1 multiplexers and modem network managers to collect alerts. It is said to use artificial intelligence to correlate alerts and figure out the most likely source of a problem.

The new pricing ranges from \$33,000 for a package managing up to 2,500 objects, to \$88,000 for a package managing 150,001 or more objects, Nynex said. Nynex will also offer free operator and administrator training for new customers.

- In the same vein, Objective Systems Integrators has just launched a new version of its NetExpert, which packages selected modules of

Network, page 55

Mobile users just a beep away

Start-up's WinBeep to extend reach of Motorola's Alert Central

By Joanie M. Wexler

■ Users hungry for advances in liberating wireless networking technology should soon see the fruits of a joint project from wireless granddaddy Motorola, Inc. and the company that recently created a stir by "beep-enabling" Microsoft Corp. Windows applications.

The goal: To use start-up Fourth Wave Technology, Inc.'s WinBeep software, which enables users at Windows desktops to send messages and files to roaming users carrying alphanumeric pagers, to extend Motorola's Alert Central plant floor monitoring system throughout the business side of companies.

Motorola's Alert Central wireless hardware/software monitoring system automatically sends messages to appropriate personnel when devices such as smoke detectors, robots and security systems go awry. However, "our customers tell us, 'too bad you can't integrate some of our other systems, like E-mail,'" said Steve Spiro, director of Motorola's Customer Owned Paging Group in Boynton Beach, Fla.

Always in touch

Most users agree and continue to express enthusiasm for being able to access nomadic employees on the fly.

"I could definitely see how the 'PC in a pocket' concept could be used in a lot of ways," said Randal Roch, director of MIS at the U.S. branch of Oxford University Press in Cary, N.C. In particular, it could be useful "when you're doing picking of books from large warehouses," he said. Though Roch's warehouse is currently small enough that "we can still shout" to get messages to floor workers, "as we extend the size of our warehouse, we need to expand ways for instantaneous communications for people who are mobile," he said.

At clothing maker Byer California in San Francisco, "a vast majority of our people are not at their desks a good part of the time," said Michael Higgins, technical support manager.

"Sometimes I have someone on the phone and I need an answer right now," Higgins added the caveat, however, that "I would not consider deployment of any wireless technology before the [Data Encryption Standard] is a part of it. Then I would see that specific application and many others rolling out in this company."

Fourth Wave will be reconstructing the current MS-DOS-based Alert Central for Motorola under the Fourth Wave architecture, which includes building it to the Fourth Wave wireless application programming interface and writing 32-bit Alert Central code under Windows and Windows NT, which will ship this summer, said Tim Hudson, president of Fourth Wave in Troy, Mich.

Hudson said there are "384,000 manufacturing plants" in the U.S., and "they will be our target customers." Among the users of Motorola's Alert Central today are Ford Motor Co., General Motors Co. and the San Francisco News Agency.

NT is the platform of choice, explained Steve Sparks, senior product planner for the Customer Owned Paging Group at Motorola, because of its multitasking and inherent networking capabilities. Today, the system can do facilities maintenance, security or dispatch "in a serial fashion — one at a time," he explained. "With NT, you'll never miss a piece of that data."

This type of development "broadens the bandwidth of a person," said David Coursey, editor of "PC Letter," an industry newsletter published in San Mateo, Calif.

"When a pager gets addressable off E-mail, it becomes fairly powerful because anyone on the network can reach this person," he said.

On call companywide

Motorola and Fourth Wave will team up to extend Windows- and NT-based paging from the plant floor to the office environment



Source: Motorola Customer Owned Paging

Beeper power

Fourth Wave's WinBeep software currently works across one-way paging systems, such as the MobileComm network. The software will link with one-way data networks, such as Embarc and Skystream, within 30 days. Two-way packet data nets, such as RAM Mobile Data and Ardis, are due this summer, Fourth Wave President Tim Hudson said.



Bank taps Advantis

By Elisabeth Horwitt
SAN FRANCISCO

First National Bank, Inc. has recruited Advantis, the IBM/Sears Communications Co. network outsourcing vendor, to manage and operate the financial service company's wide-area network for the next three years.

The idea is for First National's information systems and telecommunications departments to offload the responsibility for managing wide-area links, T1 multiplexers and circuits so they can concentrate on developing technologies and applications that are critical to First National's business, according to Webb Edwards, the bank's executive vice

president and general manager of IS. "Right now, we are focusing on how to provide better service to end users, to our affiliate banks and employees."

A major project now under way involves integrating disparate databases into a common resource that will be accessed by a common set of standardized applications, Webb said. The project, which is scheduled for completion by the end of next year, will provide users with faster, more complete access to customer account information that is often scattered across different databases and hosts, Webb said. This in turn will enable them to service customers more effectively, he added.

While First National may renew its contract after three years, there is a strong likelihood that the company will bring its WAN management back in-house at the end of the contract period, Webb said.

Advantis, page 55

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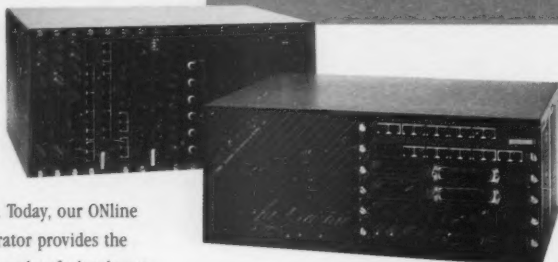
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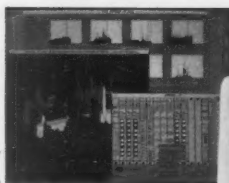
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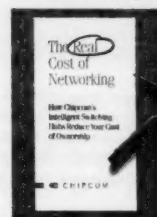
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X terminals gain sound support

By Joanie M. Wexler
MOUNTAIN VIEW, CALIF.

The X terminal fought to keep pace as a competitor to PCs and workstations this month when market leader Network Computing Devices, Inc. (NCD) introduced terminals that support sound.

The \$3,295 to \$4,295 line of color terminals is based on application-specific integrated circuit technology that NCD said allows the company to provide audio capabilities at no extra cost.

"Until now, if anyone wanted to use sound, they had to buy a PC or workstation," said Judy Estrin, NCD executive vice president, who said her firm is scurrying to give users reasons not to use those platforms.

X terminals — diskless, lower cost alternatives to PCs and workstations — run the X Window System (X) graphics-oriented protocol. X serves as the "glue" that lets users tap into a network of multipatform hosts that also run the protocol.

However, the requirement for sound on X terminals — and other desktop platforms — is debatable.

"We're not looking for sound," said Bill Holt, manager of production open systems administration at US West NewVector Group, Inc., a large X terminal shop

in Bellevue, Wash. "I'm not yet too sure of the actual value of multimedia."

"Desktop conferencing will be no significant driver to audio in the 20th century," asserted Tom Nolle, president of CIMI Corp. in Voorhees, N.J. "And to date, users have emphatically rejected voice-annotated messaging."

Application ally

NCD has formed a partnership with Z-Code, Inc., a San Rafael, Calif., developer of Unix-based electronic-mail systems, to develop just such an application. NCD is also working with Applix, Inc. in Boston to bring sound to that developer's Asterisk office automation software.

For example, Estrin explained, "you could click on a speaker symbol in a document to record or listen to sound." Estrin also suggested audible factory-floor alarms as a potential application.

Ronald R. Cooke, senior analyst at Dataquest, Inc. in San Jose, Calif., said a key point of the NCD announcement is that the digital encoding used allows the audio application to reside on a server anywhere in the network, which could be beneficial in help desk applications.

When a user has a problem, "sometimes it's nicer if you could have options explained orally in nontechnical terms," he said.

In

Brief

Retail connection

BP Oil Retail Marketing is implementing a system based on XcelNet, Inc.'s RemoteWare software to gather daily sales receipts and exchange pricing and personnel data with its 1,100-plus company-operated retail service stations in the U.S.

Holiday Inns linked

Under a three-year, \$5 million contract, Holiday Inn Worldwide will use BT's Global Network Services to link Holiday Inn hotels in Asia and the Pacific Rim with the chain's data center in Atlanta. It will also connect reservation offices and agents on the Holidex reservation system.

Multivendor launched

Rolm, a Siemens AG company, has launched a network systems and services group that will design and engineer multi-vendor voice, data and multimedia networks for customers. The installations will include broadband, video and local-area networks, which Rolm can interconnect, the company said.

EDI for Ungermann Bass

Ungermann-Bass, Inc. will enable customers to expedite the product delivery

process by communicating with the hub vendor via electronic data interchange (EDI). EDI standardizes formats by which business partners can electronically exchange documents such as shipment notification. The EDI links can expedite product delivery by two weeks, the firm said.

Railroad chooses Sprint

Sprint Corp. will provide a nationwide packet-switched data network and a Tele-mail brand electronic-mail system to PKP, the Polish state railways. The contract is valued at more than \$9 million over the next two years. The Polish railways will implement a nationwide ticketing and passenger reservation system as the first application on the network, Sprint said. Sprint will also supply managed data network services to the stock exchanges of Norway, Denmark, Sweden and Finland.

Alliance in the works

Network Systems Corp. and Storage Technology Corp. have signed a memorandum of understanding to form a strategic alliance under which they will jointly develop and market products to link mainframe storage devices to networked computing environments. The idea is to enable other systems besides IBM, Unisys Corp. and Bull HN Information Systems, Inc. hosts to attach directly to Storage Tek silos. The first systems to be linked will be Sun Microsystems, Inc. workstations, according to the partnership.

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Advantis

CONTINUED FROM PAGE 51

Nor does the company plan to outsource management of other parts of its network, such as local-area networks or IBM Systems Network Architecture, Webb said. "We're open to everything, but it just doesn't fit our strategy right now. I don't think of outsourcing as all or nothing."

Savings estimates

First National, which spends between \$30 million and \$40 million per year on communications, "certainly expects to save some money" from outsourcing WAN management, Webb said. However, he would not go into cost or savings projections on the contract.

The financial service company chose Advantis after a request for procurement that involved another network outsourcing company and two carriers, Webb said. Advantis won on the basis of cost and service and because it "already had the network control center facilities in place" to manage First National's network, he added.

First National is the first customer to sign up with Advantis since Ford Holland, Advantis' first official customer, signed its original contract with IBM Information Network.



BMC introduces dynamic tuning tool for SNA

BMC Software, Inc. recently introduced Opertune for NCP. According to BMC, the product is the first dynamic tuning tool for Systems Network Architecture networks.

IBM's Network Control Program (NCP) is an operating system designed for IBM front-end processors.

When network traffic changes occur, Opertune for NCP can sustain optimum network throughput and response times on an ongoing basis.

Network statistics are gathered and examined by the product, which then selectively determines tuning parameters based on equipment capabilities and local configuration information. Necessary modifications are made automatically.

Service interruption or program regeneration is not needed, and the parameters are automatically and simultaneously altered as network conditions change.

Opertune for NCP targets problems such as bottlenecks, query times for transactions and imbalances.

Pricing is based on NCP tier level, starting at \$10,000 for a perpetual license.

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Network players

CONTINUED FROM PAGE 51

the multivendor wide-area network fault management system at a new low price of \$60,000, a company spokesman said. The new package will include a graphical user interface, Microsoft Corp.'s Windows text presentation, alarm filtering and a gateway to SNMP-based management systems, the spokesman said.

Objective has developed links that enable its system to manage a variety of proprietary telecommunications devices and also provides tools for developing links to devices it does not yet support, he added.

Corporate target

Unlike the existing NetExpert, which is more of a build-it-yourself tool set, the new product will be a plug-and-play system aimed at corporate IS departments. Most of the Folsom, Calif., vendor's current customers are carriers such as Pacific Telesis and Infonet.

These announcements may make the above products more attractive to end users who are looking for "functional products to manage their legacy systems," Frank said.

These vendors may lose their viability a few years hence, when heavy hitters such as IBM and Digital Equipment Corp. are slated to come out with "real answers" to customers' multivendor network management needs, he added.

• Meanwhile, Maxm has announced that users can develop automated applications and routines for its Maxm system via IBM's Rexx scripting language. Maxm is said to provide automated management of LANs, WANs and data center components. Jobs or commands can be automatically initiated by an event, a schedule or a host application such as IBM's NetView. Rexx is now available for Maxm's OS/2-based Operator Workstation.

Gateways, bridges, routers

Network Systems Corp. and its subsidiary, Vitalink Communications, have announced enhancements to their 6400 and 6800 series modular bridge/routers.

An Ethernet trunk interface and an Internet Protocol coprocessor are among the new enhancements. The PDIP3 coprocessor offers improved routing capabilities for a variety of protocols, including Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s DECnet and Apple Computer, Inc.'s AppleTalk.

The Ethernet board houses four Ethernet interfaces and a Direct Memory Access engine that improves off-board performance by as much as 25% to 30% over its predecessor, according to Network Systems.

The coprocessor costs \$5,000, and the Ethernet board costs \$8,000.

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- ◆ Industry Restructuring - The IDC Perspective
- ◆ IT Spending
- ◆ Computer Industry Wars

Track 1 - Rightsizing the Enterprise

- ◆ Rightsizing in the Data Center: Choices and Opportunities
- ◆ Evolving Network Architecture
- ◆ The Services Industry Gold Rush
- ◆ Rightsizing War Stories: Lessons for Success

Track 2 - Personal Systems

- ◆ Tomorrow's Trends in the PC Systems Market
- ◆ PC Software Confronts the Enterprise
- ◆ Messaging and Advanced Group Applications
- ◆ Channel Management in the 90s

Track 3 - Winning the Midrange Wars

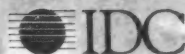
- ◆ Rightsizing for Technical Computing
- ◆ Are Midrange Systems Commodities?: A Survival Guide
- ◆ As the Unix Battles Rage, the War with NT Looms
- ◆ Midrange Contradictions

Track 4 - Networking

- ◆ Customer Directions: Managing Networking Investments
- ◆ Network Applications: Mobile Data Networks Add Another Dimension
- ◆ Local Area Networks: The Platform for Distributed Processing
- ◆ The Access Boundary: Understanding the Edge of Network Intelligence

Track 5 - Global Markets

- ◆ The New Europe: Opportunities and Obstacles for IT
- ◆ Latin America's New IT Markets
- ◆ Opportunities in the Asia/Pacific Region
- ◆ Worldwide Market Evolution - A Perspective on Japan



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Large Systems

CA's Unicenter outlines plans to go distributed

By Thomas Hoffman

As user companies steadily move mission-critical applications off their legacy systems and onto cheaper and faster client/server distributed environments, one glaring weakness industry observers have noted is the lack of robust systems management tools for environments such as Unix.

Computer Associates International, Inc. hopes it has effectively killed two birds with one stone by recognizing those shortcomings and reacting quickly.

During the past year, CA has outlined plans to port its IBM MVS-based CA-Unicenter systems management package to several different Unix environments, as well as to IBM's OS/2 2.0 and Novell, Inc.'s NetWare operating environ-

Unicenter bundles up

A vital link in CA's Unicenter strategy is the company's agreement to bundle Unicenter ports with its partners' hardware. Alan Paller, CA's director of open systems, said Unicenter will be bundled with every HP/UX box after April 1. CA has reached similar agreements with Sun Microsystems, Inc., Data General Corp., Sequent Computer Systems, Inc. and Pyramid Technology Corp. CA has not yet announced plans to bundle Unicenter with IBM's RISC System/6000, though Paller did not rule out the possibility.

ments (see story page 60). Analysts and users said that by doing so, CA has addressed several industrywide distributed management issues while strategically placing Unicenter as a lever to increase CA's installed base of customers outside the mainframe arena.

"Our research shows that enterprise buyers who are looking at distributed systems view Unix as a difficult and expensive operating system. They want the same quality of tools they're used to using in the corporate data center," noted Peter Kastner, vice president at the Aberdeen Group, a market research firm in Boston.

Unix users agreed. "It's hard to find a good systems management package on Unix. People who come from MVS find it to be a bit of a culture shock," said Gary Graham, coordinator of data management at Home Oil Co. in Calgary, Alberta.

Several beta-test users and other potential customers said they like what they have seen in the Unicenter plan.

CA kicked off its CA-Unicenter announcements last year by making known its intention to move the nine-module systems management package onto Hewlett-Packard Co.'s HP/UX.

Sam Palm, data center manager at Cheesborough-Ponds USA in Trumbull, Conn., has been testing CA-Unicenter on an HP 9000 Model

CA's Unicenter, page 60

Supercomputing in the '90s

IBM, Silicon Graphics servers edge into world of supercomputers

By Maryfran Johnson

Supercomputers are sprouting up in some surprising places lately. Both IBM and Silicon Graphics, Inc. recently introduced supercomputer-class systems at the top end of their Unix-based workstation/server lines — a move analysts and users view as a harbinger of more widely accessible and affordable supercomputing.

"The scientific, engineering and technical community is sending a very loud and clear message to vendors," said Gary Smaby, president of Smaby Group, Inc., a Minneapolis-based research and consulting firm. "They want price/performance characteristics that grow up from the workstation world and not down from the mainframe."

IBM's entry into Unix-based supercomputing is with the Scalable Power Parallel System 1 (SP1), an eight- to 64-processor system slated to make its debut in October 1993 at an entry price of \$312,000. Silicon Graphics' move into this market is planned for early 1994 with delivery of the Power Challenge XL line of shared-memory symmetric multiprocessors, scalable from two to 36 processors and priced from \$120,000.

Innovative workstation technologies such as reduced instruction set computing (RISC) processors, CMOS technology, symmetrical multiprocessing and shared memory architectures have now climbed the technical wall into the low end of the supercomputer business. Perhaps even more significantly, IBM and Silicon Graphics are producing binary-compatible supercomputers that run the same operating system and software as their workstation lines.

"This is the leading edge of what supercomputers will be doing for the next 10 years," said Ken Anderson, co-publisher of "The Anderson Report" newsletter on technical computing.

Still up in the air

Still a large question for both vendors, however, is the quality and availability of parallelizing compilers and special software development tools needed to create applications that take maximum advantage of such systems. And these low-end supercomputers are by no means an across-the-board replacement for vector supercomputers, which will still be needed for tasks such as quantum physics calculations.

Even though the IBM and Silicon Graphics systems are not generally available, the race will soon be joined by other contestants. Hewlett-Packard Co. is expected to join in with systems built from its partnership with Convex Computer Corp., and Cray Research, Inc. is working on systems based on Sun Microsystems, Inc.'s Scalable Processor Architecture RISC chips.

Analysts agreed that Silicon Graphics' Power Challenge machines will overlap the same scientific and engineering markets where IBM's SP1 is expected to appeal, despite the fundamental differences in their underlying architectures.

The Silicon Graphics supercomputer pushes its symmetrical multiprocessing and shared memory architecture to the max with a 36-processor configuration, which is accomplished by linking two 18-processor systems. Unlike the IBM system, which runs a complete version of the AIX Unix operating system on each node, the Silicon Graphics machine

How they stack up

IBM's Scalable Power Parallel (SP1) System:

- Scales: From eight to 64 processors.
- Processing power: From 1 to 8 GFLOPS.
- Special feature: High-performance, switch-enabling, high-speed communications between processor nodes.
- Entry price: \$312,000 (eight-processor system).
- Availability: October 1993.

Silicon Graphics' Power Challenge System:

- Scales: From two to 36 processors.
- Processing power: 1 to 5.4 GFLOPS.
- Special feature: 64-bit Mips Technologies, Inc. RISC processors providing Cray Y-MP-class performance in a single chip set.
- Entry price: \$120,000 (two-processor system).
- Availability: First- to second-quarter 1994.

uses a single multithreaded operating system based on its own Unix variant, Irix.

IBM's SP1 leverages the power of eight to 64 RISC System/6000 processors by integrating the communication between the processors with an innovative new switch technology. IBM officials are confidently predicting systems with more than 500 processors within two to three years.

The IBM switch technology allows SP1 users several choices: to run a single parallel job using multiple processor nodes, to execute serial tasks on individual nodes or to perform a combination of these tasks simultaneously.

"The advantage of the IBM switch is that it makes all the processors adjacent to each other," said Ted Krum, an analyst at D. H. Brown Associates, Inc. in Port Chester, N.Y. "That means it's not as hard to keep track of where your data is, and it's not as difficult to route data from one processor to another."

A number of supercomputer software developers have already signed on with the IBM system, targeting fields such as computational chemistry, engineering and electronics analysis, petroleum exploration and production.

One of the early users of the SP1 is Halliburton Geophysical Services in Houston, which is developing scalable parallel applications with the machine.

"We see this as a major turning point in our industry," said Walt Ritchie, vice president of data processing at Halliburton. "We now have the computing capability to solve complex seismic problems in a cost- and time-effective manner."

From the users' point of view, the interconnectability of such systems with their smaller workstation brethren is far more important than vendor boasts about mega-FLOPS (floating-point operations per second), GFLOPS or other "macho-FLOPS" — a humorous term coined by supercomputer analysts.

"All of them will be using RISC microprocessors that leapfrog each other every six months," Smaby pointed out. "What people will really focus on is the communication fabric underlying the network."

"This is the leading edge of what supercomputers will be doing for the next 10 years."

Ken Anderson,
"The Anderson Report"

HP user study confirms gender pay gap

By Mark Halper
SUNNYVALE, CALIF.

Reflecting a national gender bender, a Hewlett-Packard Co. user group reported that in 1992, male HP computer users earned more money than their female counterparts in comparable jobs.

According to a survey of HP users by

user group Interex, the largest disparity in pay fell in the vice president/chief financial officer/chief information officer category, where men earned an average of \$91,590 per year compared with an average of \$72,860 for women.

Male information systems directors earned an average of \$61,490, while women earned an average of \$55,170 in the

same category, according to Interex.

A male/female differential persisted throughout all computer ranks, including programmers and systems administrators.

"The survey revealed that 55.3% of the women surveyed earned \$49,999 or less, while 62.5% of the men earned \$50,000 or more, even though there were virtually

equal percentages of men and women in each job category," Interex stated in a press release.

Interex said it sent the survey to 4,100 U.S. members and received 1,512 responses.

More pay, more work

According to the user group, most respondents said that when they received a significant pay raise, their work load simultaneously increased, even though their department head counts did not drop.

Seventy-nine percent of the respondents received raises; of that group, 21.2% received raises of 7% or more, and 70% received raises of between 3% and 6%. About 2% endured pay cuts.

Of the respondents, 79% were IS managers, 11.1% were programmers/systems analysts/computer operators, 5.2% were corporate managers. The remainder held other types of positions.

Thirty-eight percent were at companies with annual IS budgets between \$250,000 and \$1 million, while 23.3% were from companies with budgets of more than \$1 million.

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Janus Software, Inc. has released ICU MVS for Computer Associates International, Inc.'s Top Secret MVS environment.

According to the company, ICU MVS is a Vulnerability Identification Tool that associates vulnerabilities that hackers or users may locate while attempting to break into an MVS system.

The product identifies all user data sets and all system resources from MVS, including supervisor calls, authorized program facilities and link pack areas when logged in as a general nonprivileged user.

The security access for each resource of the logged-on user is discovered when the product questions the Top Secret database.

Because ICU MVS can run under different user identifications, it is able to analyze various access levels and eliminate the need to modify existing controls.

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CA's Unicenter

CONTINUED FROM PAGE 57

827 since October. Palm said his staff has received comprehensive training from CA on all aspects of the Unicenter modules, which include console management, security, storage management and work-load management.

Palm said Cheeseborough-Ponds,

which also runs an IBM 3090-200 mainframe and two IBM Application System/400 machines, is impressed with the product's ability to manage information as effectively as legacy-based systems' management offerings. "When you're a lights-out shop like we are, you really need an overall tool. It looks like CA-Unicenter is the direction we want to take," Palm added.

Beta-test user Ed Wolff, group director of MIS at Break Parts, Inc. in McHenry,

Ill., said his firm was forced to downsize from its large IBM and Digital Equipment Corp. centralized environments to better respond to customer needs with a more flexible client/server information systems environment. Wolff said that while the HP Unix boxes had the horsepower to deliver information more cheaply and efficiently, he was troubled to find that Unix is not secure and is incapable of controlling message switching systems.

The CA-Unicenter port, he said, has

fulfilled that need. "By getting Unicenter in the Unix environment, we were able to gain the same kinds of control necessary in MIS on a mainframe platform," Wolff added.

Good timing

Analysts said network managers are facing similar obstacles. "We still don't have a comprehensive LAN management solution that's comparable to what's on the mainframe level. It could be that CA is very fortunate in its timing," noted Stan Schaff, senior analyst at Computer Intelligence/Infocorp, a Santa Clara, Calif., market research firm. Schaff said there are "dozens" of products on the market that address portions of the network management puzzle but no comprehensive solutions for enterprise networks.

He praised CA and Novell for developing the forthcoming CA-Unicenter for NetWare port but warned that the two vendors must develop a graphical user interface (GUI) with which local-area network managers are used to working.

CA executives said the company is addressing this concern. According to CA, the Unicenter-to-NetWare port includes both database and GUI servers. The first release of the product, slated for the second quarter of 1994, will have the IBM OS/2 2.0 workplace shell, though future releases may also include a Microsoft Corp. Windows-based shell.

One Novell user said he welcomes the Unicenter-to-NetWare port. "It's a plus for us. We'll be able to administer our LANs through different points in the organization," said M. Nicholas Lovelace, IS review officer at Connecticut Mutual Alliance in Hartford, Conn.

CA executives would not comment on other Unicenter ports but hinted that announcements are imminent. "Our belief is that customers shouldn't have to bet their careers on who's going to win the operating system war. We plan on making Unicenter available on all surviving platforms," said Alan Paller, director of open systems at CA.

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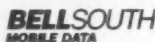
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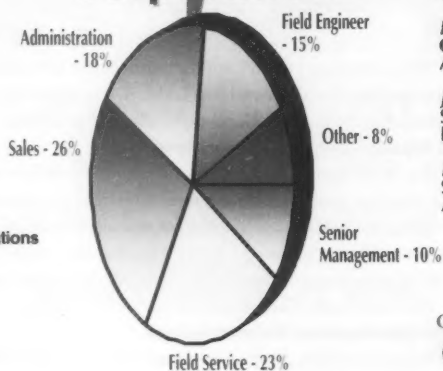
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Moving in '93

CA has announced this timetable for porting its CA-Unicenter package to various environments:

- HP's HP/UX Unix operating environment: In early release now, with general availability planned by the end of this quarter.
- IBM's OS/2 2.0: Beta-testing begins this quarter.
- Novell's NetWare network operating system: Beta-testing slated for the third quarter of this year.
- Sun, Tandem and Pyramid's Unix operating environments: Beta-testing scheduled to begin in the fourth quarter of 1993.
- IBM's RISC System/6000 AIX and DG's Avion DG-UX Unix operating environments: Beta-testing planned for the first quarter of next year.

Show preview

New tools alter development strategy

By Kim S. Nash
SANTA CLARA, CALIF.

Both Microsoft Corp. and Borland International, Inc. plan to unveil C and C++ development products this week at Software Development '93.

The powerhouses join some 40 other software firms expected to announce tools at the show, which has been gaining stature during its seven-year history as a venue for the development community to preview upcoming products.

But fancy new products may provide limited help with software development if information systems departments fail to address management and personnel issues. Assessing risks is critical to erecting a strong foundation for a given project, according to William Roetzheim, a senior associate at the San Diego office of consulting firm Booz Allen & Hamilton, Inc.

Building software with nontraditional technologies such as object-oriented or visual programming tools means changing the way projects are conceived and how developers work, said Roetzheim, who is scheduled to lead a seminar at the conference on managing risk.

Failure rates are higher in projects anchored by technologies that are new to an organization because developers have little experience with the tools and techniques. Also, the tools may be immature, so tracking product history is a good idea, he said.

Study impact

Before starting a development project, study and rate the organizational impact of the project and the tools, Roetzheim advised, adding that both programmers and project managers should spend one to three days weighing a proposed project against a checklist of factors. Determine both the likelihood and the consequences of failure in the following areas:

- **Technical risk.** Developers should assess the experience of the staff with the technique and the tool. Also, schedule the more difficult tasks early in the development cycle, if possible. That way, more recovery time is available.
- **Cost.** Managers should realistically look at the price of tools and training. Do not skimp, or you will stack the odds against yourself from the beginning. If a proposed venture calls for too much money, scale the project back.
- **Schedule.** Add more time than is needed for each major task.
- **Dependency.** Managers and developers must determine how the success or failure of a project might affect other projects under way. Conversely, you should look at how the failure of other events and projects could impact your mission.

Roetzheim cautioned that a high-risk proposal should be put into motion if the return on investment is equally high. "If you're not going to get a lot out of a risky project, it's probably not worth the effort," he said.



Software Development '93

Borland announced C++ at the show in 1991, and Microsoft unveiled C7 at last year's show.

More than 60 new PC development products are scheduled to be announced this week from some 40 software companies.

Other management issues are at the fore this year, including seminars on how to approach analytically the human aspect of introducing new technologies. Resistance, poor communications, turf-guarding and low commitment can doom a project, according to Judah Mogilensky, president of Process Enhancement Partners, a consulting firm in Silver Spring, Md.

Several Unix vendors plan to demonstrate tools for building small- and large-scale Unix applications, including Next, Inc., Centerline Software, Inc. and Unix International.

Coming soon

In addition to Microsoft's Visual C/C++ and Borland's C++ for OS/2 compiler environments, other new products on the agenda include the following:

- **Wilson WindowWare, Inc.** in Seattle plans to demonstrate WinEdit Version 2.0, a text editor for Microsoft's Windows. WinEdit comes in three types: Light, priced at \$29.95, which resides in Windows' Notepad section and provides up to 16M bytes of memory for storing and manipulating data such as CD-ROM manuals; Standard, priced at \$59.95, which includes a compiler and error-checker; and Pro, priced at

\$89.95, which includes a 199-function macro language for use in applications running under Windows.

- **Zinc Software, Inc.** in Pleasant Grove, Utah, will introduce Application Framework 3.5, an object-oriented tool set that supports DOS, Windows, Windows NT, IBM's OS/2 and the Open Software Foundation's Motif. A C++ library of objects, the product was designed to automate the matching of application events or processes with their appropriate objects. Along with a \$499 base engine, operating system-specific modules are required and range in cost from \$99 to \$1,499.

- **The WNDX Corp.** in Calgary, Alberta, intends to introduce graphical user interface building tools for both Windows NT and OS/2.

- **Lead Technologies, Inc.** in Charlotte, N.C., will unveil Leadtools 32 DLL, a graphical image compression tool kit, and Leadtools Data, which compresses any type of data file.

- **ImageSoft, Inc.** in Port Washington, N.Y., will show Object/Designer, a C++, C and Pascal application generator for Windows, and VZ Programmer, which lets programmers visually build applications for Windows and OS/2 Presentation Manager.

Middleware aids migration to client/server

By Lynda Radosevich

A new "middleware" architecture from Digital Communication Associates, Inc. (DCA) is so far being met with approval from users.

Middleware is client/server software that helps developers connect front-end applications running on PCs and workstations to back-end database servers on mainframes or local-area networks.

"What makes [middleware] unusual is not that it combines mainframe information into other applications; it's that it does it so easily. What would normally take several months can be done in a matter of days or hours," said Enrique Crespo Jr., manager of corporate sales systems at The Torrington Co. in Torrington, Conn.

Target market

Aimed at companies that are moving their computing operations from mainframes to client/server networks, DCA's Universal Communications Architecture (UCA) is a communications framework for integrating host environments, network transports, communications application programming interfaces (API) and desktop operating systems (see chart).

The first component of UCA is QuickApp, application development software that currently works with Microsoft Corp.'s Visual Basic to access APIs such as IBM's High Level Language Applications Programming Interface (HLLAPI) and Advanced Peer-to-Peer Communications. QuickApp must be used with DCA's terminal emulation products or compatible products.

"I would be in favor of anything that lowers the mainframe intimidation factor," said Bruce Laycock, network systems consultant at Montgomery Ryland, Inc., a facility management firm that operates data processing for the Loma Linda

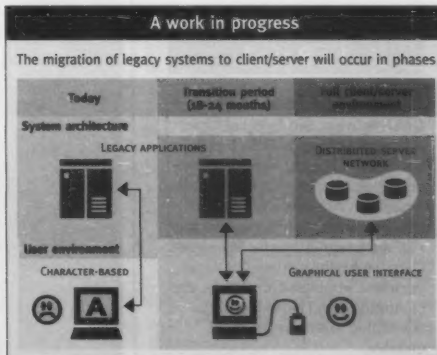
University Medical Center in Loma Linda, Calif. "Even for an experienced programmer, porting [applications] to the PC and getting used to graphical user interface and main-frame API calls can be intimidating."

"This type of philosophy does help," said Larry Disciacca, a technology consultant at Travelers Insurance Co. in Hartford, Conn. "But for us, DCA is too late" because Travelers developed its own middleware.

Beginner assistance

For those who are not so advanced, DCA's software can be useful. A developer using Visual Basic for Windows can create, for example, a PC front end to a mainframe-based application by logging onto the host and using QuickApp with DCA's Irma terminal emulation hardware and software to

Middleware, page 63



Source: Connectivité Corp.

3-D applications can be created in Windows

By Michael Vizard
BOULDER, COLO.

A major step toward integrating three-dimensional applications within Microsoft Corp.'s Windows has come to pass with the arrival of a 3-D application development kit for Windows from Spatial Technology, Inc.

Personal ACIS is a development tool aimed at programmers working with Microsoft's Visual Basic to create Windows applications. Using Visual Basic as a front end to a derivative of the LISP programming language, which manipulates the core ACIS 3-D engine, programmers can integrate 3-D applications within the Windows environment. The core ACIS engine is written in C++, while the link from 16-bit Visual Basic to 32-bit LISP is accomplished using the Dynamic Data Exchange protocol.

No exiting Windows

Using a Dynamic Link Library, Spatial Technology then connects the 3-D application created using ACIS with other Windows applications so users can manipulate those images without having to exit a Windows program.

"This is a personal 3-D modeler for engineers that can also be used as a photo-rendering tool for Windows," said Richard Sowar, senior vice president for advanced technologies at Spatial Technology.

"This is a very interesting, enabling technology for advancing 3-D on Windows and NT platforms," said Brent Williams, director of PC software research at International Data Corp. in Framingham, Mass.

Because ACIS is a widely supported 3-D graphics standard in the workstation market, Williams said the 3-D application development environment will be a key element in Microsoft's drive to position its Windows NT against Unix in the high end of the workstation market.

"As an engineer, if you know how to use the 3-D modeling techniques of, say, Autodesk, you should be able to use Personal ACIS at home on your PC," Williams said.

ACIS is currently licensed by more than 160 vendors and research organiza-

tions. Versions of ACIS are available on a variety of Unix platforms, Digital Equipment Corp.'s VMS and the NextStep operating system from Next, Inc.

"ACIS has tremendous potential because it essentially gives you a core model for 25 man-years of 3-D application development that is widely supported in 3-D application software already," said Scott

Bordin, president of Woodbourne, Inc., an application development house in West Linn, Ore., that is currently developing a stand-alone 3-D application for Windows using Personal ACIS.

"Spatial told us that they hope ACIS will become a geometric data bus standard that will play a similar role to the one Postscript plays in the publishing

world," Bordin added.

Personal ACIS costs \$995, with an introductory price of \$495 until March 31. Professional ACIS, which includes all Personal ACIS subsystems, enhanced models and application redistribution rights, costs \$5,000 for three developer seats.

Each additional seat is \$2,500, and commercial applications created for resale using ACIS require a \$250-per-unit royalty fee.

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In Brief

Better CASE tool

CGI Systems, Inc. in Pearl River, N.Y., announced PacBase for Client/Server. The improved computer-aided software engineering tool includes a local-area network repository and the ability to build client/server programs for Microsoft Corp.'s Windows, IBM's OS/2 and various Unix-based platforms, the company said. The product is scheduled to ship by the third quarter.

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Application Development

Visix ports Galaxy to VMS, desktop worlds

Visix Software, Inc. has announced the general release of its Galaxy Application Environment, a cross-platform tool set for the development of portable and dis-

tributed applications.

The tools — which are currently available for Unix — will be ported to Microsoft Corp.'s Windows and IBM's OS/2 by next month, and to Microsoft's Windows NT, Apple Computer, Inc.'s Macintosh and Digital Equipment Corp.'s VMS during the second quarter, according to company officials.

Pricing ranges from \$7,800 to \$9,600 per developer seat. There are no runtime charges.

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Ernst & Young adds to methodology tools

Consulting firm Ernst & Young has updated its Navigator Systems Series de-

velopment methodology with a new set of tools and enhancements. Navigator Release 2.0 now includes support for client/server and object-oriented applications and integrates with KnowledgeWare, Inc.'s Application Development Workbench and Powersoft Corp.'s PowerBuilder.

The Navigator 2.0 Automated Methods Environment comprises project planning, enterprise standards and on-line access to methodology information.

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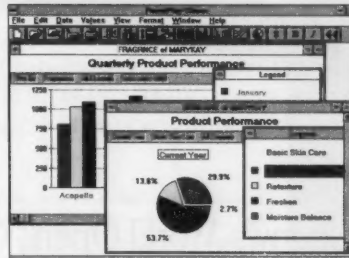
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Middleware

CONTINUED FROM PAGE 61

automatically capture keystrokes and generate the necessary connectivity code.

"DCA is playing to two trends: downsizing and rapid application development," said Tom Wood, senior industry analyst at the Business Research Group in Newton, Mass.

Traditionally, applications built using development software such as Visual Basic were limited to departmental use because developers cannot access mission-critical applications. This architecture and the resulting middleware will help software vendors and users integrate LAN and host applications, Wood said.

Offering their support

Several middleware vendors, including Connectivite Corp. and Flexus International Corp., have announced support for QuickApp and are considering plans to incorporate the software into their own development tools. Microsoft and Novell, Inc. are also backing QuickApp.

What this will mean for businesses such as Torrington is access to more host environments from a "one-size-fits-all" interface, said Connectivite President Omar M. Azmy. Torrington, part of Ingersoll-Rand Co., is a manufacturer of precision components such as ball bearings. The company uses software from Connectivite to connect PC applications to information residing on IBM 3090 mainframes and an Application System/400 minicomputer.

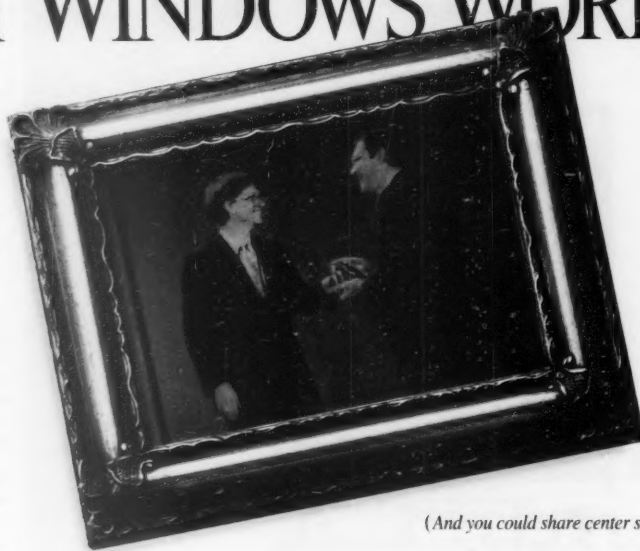
DCA will ship QuickApp with support for HLLAPI and Microsoft Visual Basic this spring for \$295.

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Management: The CEO View

Ahoy technology!

Skipper Ron Compton holds tight to faith in computers as Aetna struggles to right itself

Sailing relaxes Aetna Life & Casualty Co. Chairman and President Ron Compton. Knowing that his laptop-based executive information station is stowed safely aboard his 42-foot sailboat relaxes him even more.

"We're not talking about a lot of space or a lot of time here," Compton notes. When at sea, "The first thing I do is start up the coffee. Then, I just plug this baby in, and there I am: I can get into CompuServe, check for important messages, answer anything pressing and even get the marine weather information I need, all in the time it takes for the coffee to brew." By the time he drains his cup, he's also eased his mind, he says.

Extending E-mail to sea-mail is typical of Compton, 60, whose 38 years as an Aetna executive are studded with examples of information technology that he has pragmatically and effectively enlisted in the aid of the \$92 billion insurance giant's business goals.

Not even a knock from one of business management's reigning gurus dampens his enthusiasm. "How about the case of Aetna Life & Casualty Chairman Ron Compton?" asks Tom Peters in a 1991 book review examining how much executives should be involved with technology issues.

"He confesses to an active E-mail hookup on his sailboat. Ye gads!"

"Tom Peters just doesn't get it," Compton counters. "I don't use technology to meddle; I use it to keep informed so that I don't ever have to get unhealthily involved in any of the company's activities."

Compton's philosophy of tech-enabled awareness without interference has inspired him to design and implement an overall management methodology widely credited as a change agent at Aetna (see related story page 66).

Among the key pieces are a knowledge-based expert system available to 44,000 or so

Ahoy technology, page 66



The CEO: Ronald E. Compton, 60, chairman and chief executive officer, Aetna Life and Casualty Co.

The career: 1991: Chairman and chief executive officer, Aetna; 1988: President, director; 1987: Senior vice president, executive vice president, office of the chairman; 1980-83: President, executive vice president, senior vice president, American Re-Insurance Co.; 1975-79: General manager, Pittsburgh office, Philadelphia office, Aetna; 1972: Assistant vice president, commercial casualty division; 1968: Assistant secretary and countrywide underwriting officer; 1954: Underwriter.

The education: Northwestern University, 1954, B.A., philosophy.

Inside

Intelligence Files

- *Ideas for action.*

Executive Track

- *Comings and goings.*
 - *Calendar*
 - *Hot events.*
- Page 67.



Aetna is one of the world's largest providers of insurance and financial services to corporations, public and private institutions and individuals. It is based in Hartford, Conn.

Aetna's assets total \$92 billion, making it the nation's largest stockholder-owned insurance and financial services organization and the 15th-largest U.S. company.

The company's 1992 IS budget was a hefty \$538 million. Technology operations employed roughly 4,900 at the beginning of 1992, although the company has laid off approximately 700 IS workers in the past year. Aetna's downsizing has brought them \$200 million in projected paybacks. The IS staff is responsible for about 43,500 PCs companywide.

Aetna Chairman and CEO Ron Compton may be a major PC booster, but his point-and-click proclivities are not limited to his laptop: The chairman also spends some quality time behind a camera. "If you ask him about his photography, he'll probably downplay it and tell you he isn't all that great," says one of his close associates at Aetna. "But don't believe it: His work has been shown at galleries."

Ahoy technology!

CONTINUED FROM PAGE 35

users across the company and a repository-based executive information system (EIS) that keeps the CEO apprised of its progress.

These days, there's lots to keep track of. Two weeks ago Aetna reported huge drops in both year-end and fourth-quarter results. The insurer said it lost \$192 million during the last part of 1992. Worse, year-end income shrank from \$505 million in 1991 to just \$56 million.

Compton blamed the dismal showing chiefly on various environmental charges, losses from Hurricane Andrew and winter storm Beth, and nearly \$100 million in buyout packages for departing workers.

Despite the setbacks, Compton remains optimistic that technology will continue to play a crucial role at Aetna. He spoke recently with *Computerworld* Senior Editor Neil Margolis.

CEO's role in choosing a CIO

I think the CEO should do it.

There are four resources anyone needs to really run a company: capital, people, technology and time, which is the only one that's absolutely limited. So, at least for me, it's axiomatic that the CEO had better play an active role in the selection and [deployment] of all of these critical resources.

Of the four, technology is by far the one least understood by most CEOs. That's all the more reason why they ought to get close to it through the CIO.

Raising Aetna from IS mediocrity

When I returned to Aetna about six years ago, the company wasn't known as an exemplary deployer of IS. I had never been satisfied with Aetna's technological performance — I rated us as fairly mediocre.

So the first thing I did was an audit of our resources to find out what we were offering, what the various businesses of the company needed from us and where the differential lay. From there, we could start to plan how we would fill in the gaps.

We ended up with a baseline all right: On a scale of 1 to 10, we were safely in the three to four range on almost everything. The best score I remember any function or service ranking was a six.

This didn't go down real well with the staff. Nobody wanted to hear it — nobody here at corporate headquarters, that is. The people out in the field already knew — heck, they were the ones who told me about it. But here there was a lot of resistance, a lot of denial: This is how we've always done it, yadadadadada — and probably that was true. But the way we were doing it didn't yield quick, flexible and right.

Picking a top-notch CIO

What I needed was not a good chief information officer, but the best CIO. So I went to Naomi Seligman at The Research Board and asked her to make me a list of the 10 best users of technology in the country. Then I asked her to broker me meetings with the CIOs at each of those companies.

These folks weren't candidates for the Aetna CIO job. What I needed to do was establish a set of benchmarks in my own mind to measure the eventual job candidates against: These 10 were my benchmarks. We had had an absolutely top CIO at American Re — Judy DeMuth. I used

her as a benchmark, too.

I traveled to each of the 10 companies and studied what they were doing with IS and how they were doing it — what it was that made them so good. I picked the brains of every CIO. It took anywhere from a half-day to a day at each; you can learn a lot in that amount of time if you're not bashful about asking questions. I ran into a lot of interesting folks along the way, and their examples have continued to inspire me.

For the actual hiring of the CIO, we used a search firm. As it turned out, we hired someone [CIO John D. Loewenberg] Naomi found, who was available.

Twin roles of the CIO

One critical thing a CEO realizes from becoming involved in the selection of a CIO is that you're really not looking for one person, you're looking for two: A strategist and a manager. The big mistake you can make is assuming they're going to come in the same package. If they do, you're in a very lucky minority. Don't think you can get around the conundrum by hiring a strategist and backing him up with a good manager, or vice versa. What you'll likely end up with is a CIO who is isolated from a critical part of his job and is handicapped as a consequence. It doesn't work.

Creating a technology arm

Once we had the CIO we wanted, I created a kind of company within the company — Aetna Information Technology (AIT) — and equipped it with a board of directors, made up of the five group executives. I'm the sole shareholder. We took the customers and had them run the business.

How fuzziness blocks IS alignment

The proposition that IS be well-aligned with the needs of the business — that's getting a lot of attention these days and it ought to — is critical.

But one of the flaws that CEOs have to come to grips with is that frequently, not just occasionally, the businessperson doesn't know what he wants. He thinks he does. He'll tell you he does, and he'll tell you what it is — but he won't be right.

Importance of user involvement

Several years ago, we had a technically very good claims system that didn't go anywhere because the field claims managers hadn't been involved in creating it. It did some neat things. [But] it failed to address some needs that could have been taken care of if the users had been forced to very precisely articulate their needs.

New model: Team and plan

The old design-build-run model for IS implementation is really useless today. There's no way that works other than taking the users and the techies, locking them up together until they solve the issues of who needs what and why, and then build exactly that — with no changes in direction once construction is under way.

Until the businessperson can commit his needs to paper, complete with charts and specifications, the techies can't get started. Once they do start, the door should be barred. If it isn't, the changes'll kill you.

Why changes are fatal

At American Re, I've seen 10% of the customers build systems in one quarter of the time it took anybody else. That's because in their cases, IS went about it pretty autocratically. They got lots of customer input in the planning stages, but when it came to implementation, they took one last look and BAM! Meanwhile, there were 5,000 changes the customers would've asked for, if anyone had been listening.

There is plenty of documentation to back this up: Any changes after Day 2 are fatal. That means that you have to take excruciating care at the outset to make sure you get it right.

On the mounting importance of PCs

We used to be a big mainframe shop — and when I say big, I mean big. It took three separate computer sites to house our big iron. It wasn't all that long ago that it looked like that was the future of computing: A wall of mainframes as far as the eye could see.

I'm working on my fifth laptop right now: I've run through four, and one self-destructed. My mind isn't closed — I'm always open to a good argument. But anyone who thinks they're going to satisfy my needs with a mainframe is going to have one heck of a lot of convincing to do. •

Turning up the AMPs

Teasing out exactly what users really need (not what they think or say they need) is a key but frequently overlooked part of a successful IS/business pairing, says Aetna Chairman and President Ron Compton.

So Compton designed an executive information system to discover real user needs and to help IS tailor the technology to satisfy them. He then extrapolated the EIS' underlying methodology into an overall management approach.

Today, the Aetna Management Process (AMP) has become an active part of daily life at the \$92 billion insurance giant, says Compton.

"We AMP just about everything," Compton says.

AMP relies on the following seven pillars:

1. Identify your mission; be extremely specific.
2. Keep the emphasis on specifics; identify the success factors critical to your mission.
3. Identify and describe the factors that impact critical success factors, both within and outside of your environment.
4. Pinpoint a) where you are and b) where you want to be.
5. In each instance, set a measurable objective for closing the gap between a) and b) above.
6. Work out an action blueprint and a specific timetable for each projected gap-closing step.
7. Set up a system — automated or otherwise, whatever works best — to monitor the performance of each blueprinted plan.

—Neil Margolis

Intelligence

Files

The fleeting edge

More evidence that the competitive advantage of innovative systems does not last forever: Merrill Lynch & Co.'s technology-supported Cash Management Account (CMA), so revolutionary 15 years ago that it was patented, is now a commodity product because most securities firms offer something similar.

The CMA used information systems to give customers a combined account for money market funds, checks, credit cards, stocks and bond trading. It became Merrill Lynch's No. 1 source of new customers and accounts for \$255 billion of the company's \$475 billion in assets.

Recently, however, CMA account growth has slowed to a crawl due to competition from discount brokers and newer financial products.

Source: "Merrill's Once-revolutionary CMA Is Losing Its Edge," *The Wall Street Journal*, Jan. 7, 1993, Randall Smith, author.

Colleges try outsourcing

Many colleges have privatized their bookstores and dining halls, but now budget pressures and rapid changes in technology are causing some colleges to consider outsourcing for IS. A recent survey found 30% of colleges use contractors for at least one IS activity, and 6% have hired contractors to run their computer centers.

The University of Richmond decided to outsource because officials felt overwhelmed by demands from administrators, professors and students for computing power. At Norwich University in

Vermont, outsourcing IS has solved the problem of attracting qualified IS personnel to the institution's rural location.

Source: "More Colleges Eye Outside Companies to Run Their Computer Operations," by Thomas J. Deloughry, *The Chronicle of Higher Education*, Jan. 13, 1993.

Banks get the message

Bankers are beginning to learn what retailers have known for some time — investing in customer service pays off in higher customer-retention rates and higher revenue. This newfound interest in customer service is driving many bank technology investment decisions.

Capital investments in retail delivery systems are projected to increase 18% by 1996. Investments include modernizing branch automation systems and experimenting with self-service technologies.

Source: "Operating Budgets & Capital Expenditures for Banking Technology," a market research report by Mentis Corp., Salisbury, Md., Jan. 22, 1993.

EDI in Japan, Inc.

During the past 20 years, electronic data interchange (EDI) in the U.S. has migrated from proprietary protocols to industry-specific standards to the cross-industry ANSI X.12 standard. But in Japan, open EDI standards have been slow to develop.

Japan's close-knit groups of trading partners already enjoy many of EDI's advantages through closed, proprietary systems for the exchange of business data. However, last April the Japan Information Processing Development Center released a cross-industry EDI standard called the CII Syntax Rules.

Several industry associations in Japan have agreed to conduct a trial of the rules, which may be the foundation for a Japanese EDI standard and spur development of EDI translation software.

Source: "EDI Development and Trends in the United States and Japan," a paper by Donald J. McCubrey, University of Denver.

Court imaging rules

Court administrators are beginning to consider imaging technology for applications such as processing traffic citations. Here are five "ground rules" to consider:

- Imaging systems are only as good as the database serving them. Accurate indexing is critical.

- Optical character recognition (OCR) systems are not accurate enough for legal work. OCR can enhance the docu-

ment indexing process, however.

- Image computer files are large. An image of the average traffic ticket in Los Angeles takes up 50K bytes, with data compression.

- Fast networks are needed to link desktop computers to the imaging server.

- Because imaging is expensive, it should be used for active case processing rather than archives.

Source: "Imaging Can Ease Courts' Record-Keeping Tasks," by Jim McMillan and Tom Dibble, *The National Law Journal*, Feb. 1, 1993.

Compiled by the CW staff.

Calendar

MARCH 7 - MARCH 13

Geographic Information Systems (GIS) in Business '93 Conference. Boston, March 7-10 — Contact: GIS World, Fort Collins, Colo. (303) 223-4848.

First Workshop on Object-Oriented Design '93. Snowbird, Utah, March 8-10 — Contact: Object-Oriented Software Engineering, Brookfield, Wis. (414) 789-5253.

XWorld. New York, March 8-11 — Contact: XWorld, New York, N.Y. (212) 274-9135.

Inter networking with NetWare. Boston, March 9-10 — Contact: Center for Advanced Professional Development, Santa Ana, Calif. (714) 261-0240.

Technical Symposium on Computer Science Education. Phoenix, March 10-12 — Contact: Association for Computing Machinery, New York, N.Y. (212) 889-7440.

MARCH 14 - MARCH 20

National Automated Clearing House Association Conference (NACHA). San Diego, March 14-17 — Contact: NACHA, Herndon, Va. (703) 742-9190.

Uniforum Technology Managers' Conference. San Francisco, March 15-16 — Contact: Uniforum 1993, Registration Dept., Carol Stream, Ill. (708) 260-0396.

13th Annual Conference: "Clinical Information Systems." March 15-17 — Contact: Laura Lee, Society for Clinical Data Management Systems, Los Angeles, Calif. (213) 224-6259.

The Workgroup Computing Conference. Washington, D.C., March 18-19 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3870.

The 1993 Long Island Conference of Artificial Intelligence and Computer Graphics. New York, March 20 — Contact: New York Institute of Technology, Old Westbury, N.Y. (516) 686-7623.

Executive

Track

McKesson Corp. reportedly has reassigned its first chief information officer, Russell J. Harrison. The \$10.3 billion pharmaceuticals and health firm hired Harrison, a 29-year IBM veteran, as its first CIO in October 1991. Now, however, the San Francisco-based company says Harrison can serve better as a vice president focusing on order processing and other tasks affecting hospitals, buying groups and suppliers.



en sales and marketing systems.

Avis, Inc. has appointed Nicholas O'Connor director of systems development. The 21-year company veteran will be responsible for developing Avis' computer-driven sales and marketing systems.

BSG Consulting, Inc. in Houston continued its expansion with the announcement of two new positions. Director Peter Ryder will focus on business re-engineering, while Eric Reed will serve as director

of BSG's Technical Knowledge Organization.

Both will be stationed in the firm's Houston headquarters. The 250-person consultancy specializes in client/server technology and systems integration.

CompuServe, Inc. has named John Thompson general manager of the Mid-Atlantic Region of its systems integration group, based in McLean, Va. Thompson, most recently director of operations at Evernet Systems, Inc., will direct a staff offering local-area network design, implementation and consulting.

Awards
Electronic Data Systems Corp. and **Anderson Consulting** were named top firms in the second annual excellence contest held by "The Integrator," a Barnegat, N.J., newsletter. Dallas-based EDS took honors as "integrator of the year," while Andersen Consulting in Chicago was named "best commercial systems integrator."

SHL Systemshouse, Inc. won "best rising star" and "best client/server" integrator awards. Winners in the \$50 billion worldwide industry were selected by a panel of industry observers, journalists and analysts.

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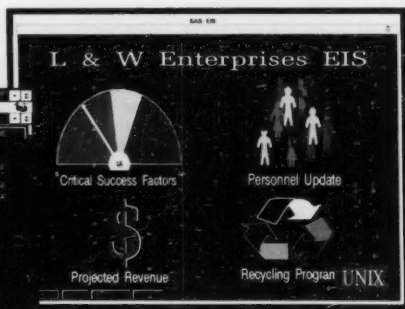
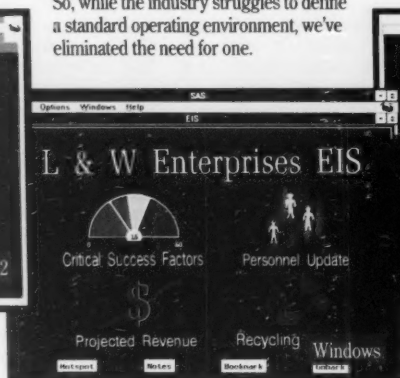
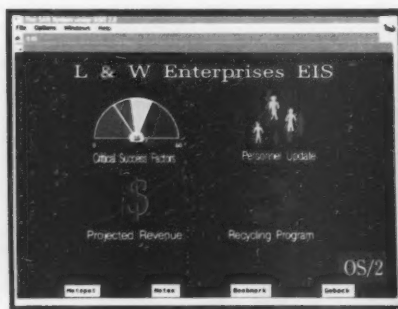
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The CW Guide: Desktop Operating Systems

The **BEST** for the desk

Sorting out vendor schemes and product features can be difficult. Ultimately, the best choice depends on how you plan to use your operating system.

▶ **WINDOWS** (MICROSOFT)

STRENGTHS: Windows NT combines the power of multitasking and memory management with the intuitive interface of Windows 3.1. The DOS/Windows/NT trio is highly scalable, supporting the smallest laptop up to DEC's Alpha systems.

WEAKNESSES: NT won't be available until midyear at the earliest, and the first release may lack the maturity and stability of its competitors. Beta-test versions require substantial memory and disk space.

▶ **OS/2** (IBM)

STRENGTHS: Users like the fact that it runs several processing tasks simultaneously and doesn't crash when an application crash occurs. OS/2 serves as a highly stable and reliable platform.

WEAKNESSES: OS/2 requires substantial memory and disk space, and it operates only on Intel-based microprocessors. There's also a dearth of native OS/2 applications.

▶ **UNIX** (SUN, SANTA CRUZ OPERATION, NOVELL)

STRENGTHS: User-friendly interfaces are now available, which puts a familiar face on Unix's powerful but difficult to use features, such as multitasking and multiuser support.

WEAKNESSES: You can pay a significant price for Unix, compared with other operating systems, in terms of hardware and training. It can also be complicated to install and administer.

▶ **SYSTEM 7** (APPLE)

STRENGTHS: Users report high stability and ease of use. They say applications are easier to master because of the consistent interface. System 7 also exhibits the best handling of graphics applications, compared with other operating systems.

WEAKNESSES: System 7 requires state-of-the-art Macintosh hardware, and users say it is still difficult to integrate into the PC-oriented business world.

TOP 10 USER PRIORITIES

15 professionals were asked to rate the most important qualities of a desktop operating system.

- 9.1 Stability
- 8.7 Compatibility
- 8.4 Ease of use
- 8.4 Value for the dollar
- 8.2 LAN capability
- 8.1 Available third-party applications
- 8.1 Speed
- 7.9 Memory management
- 7.9 Service and support
- 7.7 High-quality documentation

Surprise: Multitasking places third to last in user importance among 15 categories.

Based on Buyers' Scorecard survey of 180 IS professionals, who ranked the importance of each area based on a 1-10 scale, where 10 is most important.

INSIDE

So, you want a new desktop operating system? Probably the most valuable information you can receive is straight from the users. According to our Buyers' Scorecard survey, each user group finds different strengths and weaknesses in their operating systems. **Page 71.** Beta-test users say NT is meeting expectations so far. **Page 75.** Specific users also relate their desktop tales. **Page 74.**

The big-picture view is also important; a leading member of the Microcomputer Manager's Association talks 'vendor strategy' for the top products in the 32-bit world. **Page 70.**

And, of course, there's always the issue of cost — one of the biggest concerns for any major platform move. We explore the price of migrating to a GUI. **Page 73.** In fact, some contrarians are posing other options to GUIs. **Page 74.**

Desktop Operating Systems

One isn't always enough

Picking the right mix of systems requires studying how they relate to your business

You may be heartened to know that whatever desktop operating system you choose, it won't sound the death knell for your company, nor will the decision make or break you financially. However, the wrong decision will ripple throughout your organization in the form of future technology directions and how flexible your operations are.

For instance, you might have difficulty with application interoperability, configuration management and processor administration if the wrong operating system is applied. In ad-

dition, the personal tools with which you outfit your staff directly correlates with the staff's efficiency, productivity and competitiveness. In this way, too, your operating system will impact your business.

From IBM to Microsoft Corp. to Apple Computer, Inc. to the many Unix providers (including The Santa Cruz Operation, Novell, Inc. and Sun Microsystems, Inc.), there are operating systems galore, providing vastly different capabilities. It's already been established that no one operating system will prevail as "winner take all." Rath-

er, each system's relevance is based on the makeup of your business, the systems you intend to deploy and the goals you hope to achieve.

In fact, many companies will likely install a variety of operating systems, depending on where they fit best, such as OS/2 for development, Windows for administration tasks and Unix on the server.

To help you find your way through the operating system world, we have taken a variety of perspectives: what users think, what vendors intend and what studies show.

The enterprise view

Top players' schemes differ

By Mark Roy

Features and functions are certainly important when choosing your company's future desktop operating systems. However, it is also mandatory that you view each system in light of the current computing platforms you have in place.

Bridging the gap between legacy systems and future desktop technologies is the difficult challenge faced by information systems managers — as is choosing the operating systems.

Three major players in the 32-bit world — IBM, Microsoft Corp. and Sun Microsystems, Inc. — have set out vastly different offerings for their next generation of desktop operating systems.

Following is how each vendor's offering fits into a working enterprise, complete with a review of strengths and weaknesses for each system.

Roy is the vice president of the National Microcomputer Managers Association (MMA) and a founding member of the MMA-New England. He can be reached at (508) 366-0040, Ext. 297 or via CompuServe 73257,633. He is currently a senior network consultant at Bytex Corp.



User profile: A company choosing OS/2 would likely value reliability above flexibility and prefer the security of a single-vendor approach, from the server to the network to the client. An example

minimal sessions and file and peripheral sharing, as well as real-time data such as live news feeds and peer-to-peer communications.

In an OS/2 scenario, the knowledge worker is presumed to be predominantly office-bound and the focus of these networked services.

In this communications structure, OS/2 accepts data types arriving at asynchronous times and rates and in a variety of data types. Who among us has not had trouble doing simple things such as downloading from CompuServe at 9.6K bit/sec. while maintaining a 3270 session and running a couple of other

applications under Windows 3.0/3.1?

Hallmarks of the "IBM Office" are Personal System/2s with 386 processors or better. The communications needs are a combination of mainframe or minicomputer applications, which combine traditional Systems Network Architecture (SNA) terminal sessions and advanced peer-to-peer and cli-

ent/server applications. The latter would include access to large-system databases using the OS/2 graphical user interface as a robust front end, replacing older CICS or terminal-based environments.

IBM's offering was designed to leverage and extend the SNA investment while providing robust network services to the enterprise.

Smaller applications could be distributed across workstations, building on the ability to use the combined platform strength and recoverability of a distributed strategy.

Using Advanced Peer-to-Peer Networking (APPN), each workstation is also a server with responsibility for a portion of the system support, thereby increasing performance and utility.

OS/2 runs on PCs by vendors other than IBM. However, it was uniquely designed to take advantage of the capabilities of the IBM Micro Channel Architecture (MCA).

Biggest strengths: As much as IBM may be bashed for its complexity and narrow view of knowledge worker needs, when OS/2 is placed in context with the broad SAA strategy, OS/2 and MCA PCs make perfect sense. For those environments where IBM is the strategic direction, OS/2 is a clear winner.

In an OS/2 and SAA environment, **Top players, page 72**



OS/2:

Access to OS/2 engineers and developers is available on CompuServe. At a CIS prompt, enter "FIND IBM" for a listing of forums. Especially recommended is the APPC Forum (GO APPC). Check out The APPN Story in Library Four.

NT:

Access to Microsoft engineers and developers is also available on CompuServe. At a CIS prompt, enter "FIND MICROSOFT" for a listing of forums. Try the Windows NT Forum ("GO WINNT") for the latest progress on NT developments.

Information, page 72

Strategy (mostly) matches needs	
<p>"ON A SCALE OF 1 TO 5, WHERE 5 IS EXTREMELY WELL AND 1 IS POOR, HOW WELL DOES YOUR CURRENT VENDOR'S OPERATING SYSTEM STRATEGY MEET YOUR NEEDS?"</p> <p>RESPONSE BASE: 180 BUYERS' SCORECARD SURVEY RESPONDENTS</p>	
Microsoft Windows	4.1
IBM OS/2	3.9
Apple System 7	3.8
SCO Unix	3.7

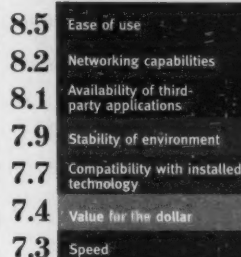
is a financial services firm, where transactions depend on system commonality and conformity.

Overview: OS/2 is a portion of the revised IBM Systems Application Architecture (SAA). The desktop system is an integral component in a network of high-powered servers, which can run the gamut of mainframes, minicomputers and PCs. Services can include ter-

Desktop Operating Systems

Buyers' Scorecard: Apple System 7 leads the way in desktop satisfaction

Apple's System 7.x

OVERALL SCORE: **78**

RESPONSE BASE: 50 USERS

Would you buy the product again?

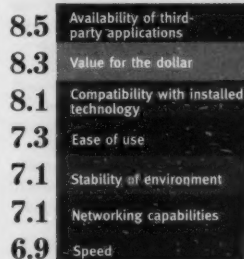
44

LIKELY
REASON:
Easy to use

6

UNLIKELY
REASON:
Doesn't fit
our needs

Microsoft's Windows 3.x

OVERALL SCORE: **74**

RESPONSE BASE: 50 USERS

Would you buy the product again?

47

LIKELY
REASON:
Easy to use

2

UNLIKELY
REASON:
Don't need it

DON'T KNOW

By Derek Slater

The Buyers' Scorecard asked users to rate the market leading desktop operating systems based on their individual features and functions. While Apple Computer, Inc.'s System 7 garnered the highest satisfaction score, each operating system proved to have distinctive strengths and weaknesses in key areas.

The 32-bit Macintosh operating system lived up to its reputation of providing exceptional ease of use, respondents said. System 7 earned the highest overall score of 78, including top scores in stability and overall ease of use.

Its lack of compatibility with the IBM-Macpatible world was a drawback. Users were also dissatisfied with the hardware and software costs involved in running System 7.

Microsoft Corp.'s Windows 3.x, running with DOS, placed second to System 7 in ease of use and second overall with a score of 74. In general, Windows' strengths were the opposite of the other systems in the survey.

Windows earned high satisfaction grades in value for the dollar and kudos for its compatibility with installed hardware and DOS applications. Its weaknesses, users said, were in speed and stability. Users rated the product lower in networking capabilities as well. While 65% of the other respondents surveyed reported using their operating systems on networked systems, only 42% of the Windows users were networked.

The Santa Cruz Operation's

Open Desktop, which runs atop Unix, is notable for its multiuser support, respondents said. Nearly all its users said their PCs are networked.

The product also scored highest in the area of multitasking, ahead of IBM's OS/2. It placed behind its competitors in ease of use and ease of installation.

IBM's OS/2 2.x users gave the product its highest marks in multitasking, value for the dollar and networking capabilities, singling out multitasking as the product's key benefit.

OS/2 rated lower than the other products in key areas, including availability of third-party applications and vendor service and support.

According to International Data Corp., DOS still dominates the desktop, with a 53% share for 1992; Windows is second with a 28% share; Macintosh is third with 10%; and OS/2 is fourth with about 7%. Unix was less than 2% of the PC operating system sales.

Buyers' Scorecard records users' satisfaction with their installed technologies. Users assigned 1-to-10 ratings based on their satisfaction with their desktop operating system in 15 specific categories. All categories were factored into the final scores. (For a complete list of categories, see chart on page 69.)

The majority of the 180 Scorecard respondents were information systems professionals: directors and higher (9%), managers (24%), end-user computing managers (10%), local-area network administrators (3%) and system analysts (11%). *

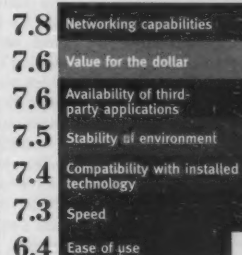
METHODOLOGY

User names were obtained from nonvendor sources. First Market Research Corp., an independent market research company in Austin, Texas, conducted the survey and tabulated the results. The response base was 30 users of The Santa Cruz Operation's Open Desktop and 50 users each for the other products.

Users rated their satisfaction with their installed products and were not asked to compare or rate one product directly against another in the survey.

To compute the overall score for each product, perform the following steps: 1) Multiply the product's score in each category by the importance rating for that area. 2) Average the resulting figures and convert to base 100. Numbers are rounded off where necessary.

SCO's Open Desktop

OVERALL SCORE: **73**

RESPONSE BASE: 30 USERS

Would you buy the product again?

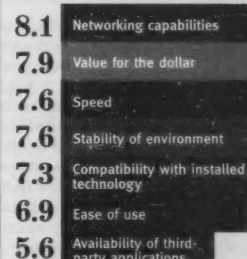
24

LIKELY
REASON:
Meets our
needs

6

UNLIKELY
REASON:
Compatibility
problems

IBM's OS/2 2.x

OVERALL SCORE: **72**

RESPONSE BASE: 50 USERS

Would you buy the product again?

40

LIKELY
REASON:
Multitasking

10

UNLIKELY
REASON:
Compatibility
problems

Desktop Operating Systems

How Univel fits into the picture

It's easy to make the mistake of comparing what Unix System Laboratories, Inc. and Novell, Inc. are doing with their operating systems to the offerings from IBM, Microsoft and the various other Unix suppliers, such as Sun. The differences are quite significant.

First and foremost, Univel was not intended to be a desktop operating system. Rather, it is supposed to be an application engine that provides seamless local-area network integration. The applications to be run will be specifically geared toward LAN operation.

For example, the security components of the MIT Kerberos system can run as a process on the server, independent of the file- and peripheral-sharing functions but linked to an accounting process to track on-line time and application use. Based on various triggers from the server, management applications can be run to track and log, for instance, disk utilization and capacity.

Watch for Univel to unveil advanced client applications for the major desktop operating systems to take maximum advantage of the new server-based capabilities. This facility—combined with advanced peer-to-peer communications on powerful APIs able to run on various platforms—will catapult user access and workgroup computing into action.

These benefits, however, will apply only to Novell users. The Univel solution was designed to address only the shortcomings in the Novell environment. Issues of workstation-level peer and enterprise communication are still outstanding.

A better scheme may be to continue to use existing file servers in their current capacity and add more power with a desktop-empowered strategy.

—Mark Roy

Top players' schemes

CONTINUED FROM PAGE 70

ment, older terminal-based applications running on large embedded systems can continue to provide valuable service to the enterprise. By using additional tools, the large systems application front end can be separated from the data and can allow new applications to be developed in a client/server model.

Through APPN, even greater communications can be initiated for robust workgroup connectivity. The advanced nature and full-system control provided under OS/2 (not to mention its lack of reliance on an underpinning DOS) make it a highly stable and reliable platform for application operations.

Applications that do leverage OS/2's capabilities provide significant access to current and future IBM systems.

Advanced network management, database front-end analysis and executive information systems all currently benefit from OS/2's outstanding features.

Biggest weaknesses: OS/2 is hindered by substantial hardware requirements and the limitation to operate only on Intel Corp.-based microprocessors.

Although a few thousand applications currently run in the OS/2 environment, most are not mainstream applications, nor do many take maximum advantage of the OS/2 environment, having been "ported" from the earlier DOS or Windows versions to become OS/2 also-rans.



User profile: If your shop is comprised not of heterogeneous knowledge worker tools but of cross-platform applications, data sharing and workgroup computing, the Microsoft strategy is for you.

A Windows NT company values flexibility and needs a variety of platforms, portables and networks with a wide array of applications and an interface that is familiar to users. It's also capable of supporting a system that does not have proven reliability, security and stability.

An example is a consumer products company, where there are varied types of users, including salespeople on the road, financial workers with spreadsheets, manufacturers and marketers.

Overview: In Microsoft's view, work forces are nomadic, armed with palmtops, laptops and portables. Route drivers, salespeople and mobile managers need timely information that can be received, examined, manipulated and stored.

Back in the office, this rich text and graphic data must be seamlessly retrieved by other users to complete the business cycle. Powerful processors and high-end workstations crunch and manage the data.

To provide continuity, Microsoft developed application programming interfaces (API) de-

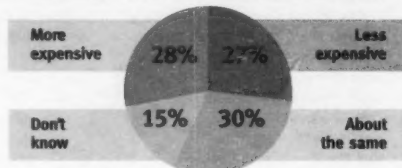
signed to leverage backward compatibility with DOS systems and bolster new advanced applications. Dynamic Data Exchange and Object Linking and Embedding support cross-application communications and manage complex data types incorporating images, video and sound.

The Windows Open Services Architecture (WOSA) is an open-ended API allowing integration of Windows and Windows-based applications with larger enterprise systems. WOSA incorporates Open Database Connectivity and Messaging Application Programming Interfaces (MAPI) — a database API based on the work of the SQL Access Group — as components. MAPI allows communications with mes-

The cost of supporting a GUI

"IS IT MORE OR LESS EXPENSIVE TO SUPPORT GUI OPERATING SYSTEMS, COMPARED WITH THEIR CHARACTER-BASED PREDECESSORS?"

RESPONSE BASE: 180 BUYERS' SCORECARD SURVEY RESPONDENTS



saging systems.

Biggest strengths: Adhering to the promise of backward compatibility, Microsoft's scalable operating platform trio (DOS, Windows, NT) supports the smallest laptops to systems running Mips Technology, Inc.'s R4000 chip up to the substantial new line of Digital Equipment Corp. Alpha-based systems. NT's support for symmetric multiprocessing (SMP) at the thread level was recently demonstrated on a Sequent Computer Systems, Inc. Symmetry/750 with 16 Intel 50-MHz 1486 processors.

The information systems manager is thus provided with both the logical and the financial ability to spend scarce resources where necessary while still providing full function to the knowledge worker.

Because applications across platforms are heterogeneous, issues of training, network software licensing and application management are reduced.

Biggest weaknesses: Caution should be observed if you contemplate a Microsoft-based strategy. With all its promise, NT is not available. Claims of reliability and performance must be proven in the marketplace crucible. The Windows NT beta-test version that shipped in October 1992 did not yet include scheduling and electronic-mail features. Tuning for the NT File System and memory size are still under way.

Windows 3.1, while more stable than Windows 3.0, remains tied to single-threaded DOS. With device drivers groaning to support the API activity churning above them, unidentified application errors have yet to be eliminated.



User profile: A company choosing Sun's Solaris would typically have a disparate variety of processors, each selected for unique applications (such as security authentication) and purposes (such as an SMP database server) but still part of the



Continued from page 70

Also available is the Microsoft Developers Network, through which compact discs packed with information and sample code for all Microsoft languages and systems are distributed on a regular basis. Call (800) 227-4679 or send a message via E-mail to devnetwk@microsoft.com for information or to enroll. It includes the "Microsoft Developer Network News," published bi-monthly.

NT, in depth:

Computer Technology Research Corp. has published "Windows NT — Microsoft's New Operating System Strategy." Having used a beta-test copy of Windows NT since mid-1992, the authors provide a critique of NT's performance, look and feel, security options and memory requirements and compare it with OS/2 and Unix. The report also examines how NT will affect other parts of the industry such as the Advanced Computing Environment consortium, application development, networking and more. The price is \$190 per copy. Contact: Brian Lindgren, editor, at (803) 853-6460.

Forecasts from Europe:

According to London-based market research firm Ovum, which takes a look at the desktop market in Europe in its recent "Software Product Markets Europe" report, each desktop operating system will have a place in corporations. Unix will remain the platform of choice for technical applications, while OS/2 will be used mainly for corporate applications where PC-to-host communications are important. The Apple Macintosh is expected to hold its market share of about 10% in Europe, and Windows NT installations will overtake OS/2 and Unix during 1995 as increasing stability encourages existing Windows users to migrate to that platform. Annual subscription is \$2,315. Contact: Julian Hewett, Heather Stark or Brigitte Engelen at (011-44) 71-255-2670.

GUI migration test:

For more information on the cost of graphical user interface migration, see the Management section in the Jan. 18 issue of *Computerworld*.

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- 95. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
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- 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm.
- 23. Network Sys. Mgt.; LAN Mgr., PC Mgr.
- 24. Dir./Mgr. Sys. Development, Sys. Architecture
- 31. Programming Management, Software Developers
- 41. Engineering, Scientific, R&D, Tech. Mgt.
- 60. Sys. Integrators/VARs/Consulting Mgt.

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- 12. Vice President, Asst. VP
- 13. Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT

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- 70. Medical, Legal, Accounting Mgt.

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- 60. Government -State/Federal/Local
- 70. Communications Systems/Public Utilities/Transportation
- 80. Mining/Construction/Petroleum/Refining/Agric.
- 90. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 95. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
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- 23. Network Sys. Mgt.; LAN Mgr., PC Mgr.
- 24. Dir./Mgr. Sys. Development, Sys. Architecture
- 31. Programming Management, Software Developers
- 41. Engineering, Scientific, R&D, Tech. Mgt.
- 60. Sys. Integrators/VARs/Consulting Mgt.

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- 51. Sales & Mktg. Management
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- 80. Educator, Journalists, Librarians, Students
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☐ YES ☐ NO

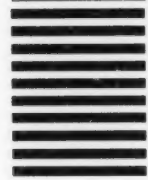
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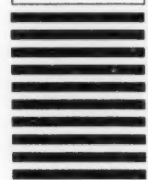
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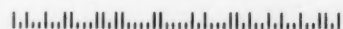
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Desktop Operating Systems

corporate whole. Data must be shared, but not at the expense of popular and easy-to-use applications. An example is an aerospace company where there's heavy research and development — engineers who love Sun workstations running Unix, as well as other users more familiar with PC platforms.

Overview: Raw Unix is an uninviting world. Knowledge workers need power, yes, but the objective is productive work, not wasted time navigating an obfuscated operating system.

This is where Solaris comes in. The Solaris environment provides compatibility with popular applications while maintaining the power, flexibility and utility of Unix. Although the advanced features of Solaris are best used on Sun Scalable Processor Architecture (SPARC) systems, Solaris also runs on Intel systems. Built from a common source-code base, Solaris can support many applications on either platform. Consider the fact that Sun has built workstations based on Intel processors since 1985.

Solaris also scales from midrange Intel systems (80386 and up) and Sun SPARC systems to supercomputers from Cray Computer Corp. In this way, Solaris integrates current PC applications with powerful systems while maintaining control of management and administration.

Biggest strengths: The IS manager choosing Solaris is positioned to support the current generation of workstations and knowledge worker needs, but Solaris is also driving toward the advanced capabilities of distributed computing. Specialized servers will manage data and applications based on clearly specified needs using single or multiprocessor systems. Administration, security and configuration management can be managed in an organized manner using integrated tools.

Solaris offers the power of an industry-leading, multitasking, multiprocessing operating system with fully integrated, open networking to provide the most powerful graphical environment ever developed.

Biggest weaknesses: Be prepared to pay a significant price for this power in relation to OS/2 and Windows NT. Solaris averages some \$795 per workstation. There are also additional costs you need to consider for education in the world of Unix administration. Though there is much correlation to the DOS world, Solaris poses sufficient complexities that require diligent care to maintain such an advanced environment.

As many would argue that OS/2 and Windows NT are overkill for the desktop, the same argument could be levied toward Solaris.

.....

As each IS manager knows, there comes a point in the technology life cycle when obsolescence requires us to abandon the old for the new. That fact in itself gives us pause: Although OS/2 and NT are multitasking, they are not multiuser.

Though multithreaded, there's no support for parallelism. Of the three, only Solaris supports all this, provides backward compatibility for popular applications and fully supports open standards. If the decision we are making is to be truly strategic, we must realize the shortcomings of popular technology directions.

The IS manager has greater flexibility than ever before in customizing the enterprise environment. Major players have developed systems to manage data and applications for maximum performance, on or across platforms. No limits are placed on the network construction or data types that can be supported. However, problems can arise from improper application of an operating system to the task at hand.

Maybe in the 24th century, there'll be only one operating system. All systems will interoperate and will understand our implication by context. For now, though, we must make good design choices. •

There comes a point where obsolescence requires us to abandon the old for the new.

The price of migration

A recent study says it can cost an average of \$4,000 per PC to move from a traditional desktop operating system to a GUI-based one

414 members of the Microcomputer Managers Association (MMA) were asked how much it cost to move to one of today's leading GUI-based platforms. The mean migration cost for each operating system is at the top of the table. The rest of the table provides a more detailed look at how

much, on average, the respondents paid for specific elements of the migration. The numbers reflect the percentage of respondents who reported spending within each given range. Response base: Unix (78), OS/2 (107), Windows (163) and Macintosh (129).

WHAT IT COSTS TO MOVE TO EACH PLATFORM

UNIX:
\$4,241

OS/2:
\$4,219

WINDOWS:
\$3,917

MACINTOSH:
\$4,163

THE TABLES

Price points: Less than \$500, \$500 — \$999, \$1,000 — \$1,499, \$1,500 — \$1,999, \$2,000 or more

HARDWARE

Hardware upgrade costs are slightly higher for Unix than for other operating systems and lower for Windows 3.x.

	17%	23%	28%	7%	24%
PC Unix					
OS/2	15%	29%	21%	8%	27%
Windows 3.x	21%	29%	21%	9%	20%
Macintosh System 7.x	22%	26%	19%	8%	24%

SOFTWARE

70% of the Windows respondents paid less than \$1,000 for software upgrades per PC.

	26%	39%	20%	9%	7%
PC Unix					
OS/2	26%	37%	26%	8%	4%
Windows 3.x	27%	43%	20%	7%	3%
Macintosh System 7.x	23%	43%	20%	10%	3%

NETWORKING HARDWARE AND SOFTWARE

The trend continues with 80% of the Windows users upgrading networking gear for under \$1,000 per PC.

	52%	22%	9%	6%	10%
PC Unix					
OS/2	51%	28%	7%	8%	5%
Windows 3.x	55%	25%	7%	5%	8%
Macintosh System 7.x	55%	21%	9%	7%	9%

TRAINING

Training costs are highest for OS/2, with 26% of the respondents paying more than \$1,000 per PC.

	46%	32%	11%	3%	8%
PC Unix					
OS/2	45%	30%	14%	8%	4%
Windows 3.x	50%	28%	13%	5%	4%
Macintosh System 7.x	50%	27%	11%	7%	6%

SERVICE AND SUPPORT

System 7 and OS/2 have the highest service and support costs, with 28% of respondents spending more than \$1,000 per PC.

	45%	31%	9%	7%	8%
PC Unix					
OS/2	47%	26%	13%	7%	8%
Windows 3.x	53%	25%	11%	5%	6%
Macintosh System 7.x	48%	25%	12%	9%	7%

Source: Microcomputer Managers Association/IDG Research study

(Numbers rounded off)

Train drain

Sony Pictures Entertainment spent approximately \$50,000 total for outside training, plus approximately \$350 per PC for memory and hard disk upgrades, to move 22 users to OS/2.

Hardware need high

Application upgrades and other software expenses prove less costly. Of the respondents, 30% moved software as a key cost, compared with 64% for hardware and 45% for end-user training costs.

RAM required

Extra memory is often a key hardware upgrade. Moving from DOS to OS/2 2.x, a department at Northwestern Mutual Life Insurance Co. found that 486-based systems needed 640K bytes of RAM to get satisfactory performance. "I would have preferred 8M bytes," said Peter Van Opens, a systems coordinator. Northwestern Mutual spent just under \$200 per PC on memory upgrades.

Staff surge

63% of the MMA respondents agreed that increased staffing was necessary to handle installation and hardware upgrade issues when migrating to a GUI operating system.

Desktop Operating Systems

From the trenches

What users want on their desks



►Jo Haraf, director of office technology, Booz Allen & Hamilton, Inc., McClean, Va. Current operating systems: Macintosh, Unix, DOS.

Comment: "I suppose I want stability and the ability to move easily between different levels of an operating system. [We've had] problems with Apple and earlier versions of operating systems not allowing us to print from the old operating system and the new version. Vendors should let us know which functions will be upwardly compatible and which won't."

"I'd also like my operating system to do its job and run in the background."

"As for [my] next operating system, in Unix I can't say what we will standardize on, but in Apple it will be System 7 or 6.8. For DOS, we will run the most current Microsoft operating systems."

►Bruce Linker, assistant vice president, group information technology, Dean Witter Reynolds, Inc., New York. Current operating system: DOS/Windows.

Interviews compiled by Alice Bredin, a freelance writer based in New York.

Comment: "I'd like to get past the 640K limit. We have 6M and 8M, and the operating systems aren't keeping up. We're looking at NT or OS/2 because we want multitasking and multithreading. IBM is there; it just needs to be cleaned up. Otherwise, we'll stay with Windows."

►Carol Meadows, manager, Great Western Bank, Chatsworth, Calif. Current operating system: DOS/Windows.

Comment: "I'd like faster print spooling and disconnected printing capabilities so that I can work on other things while something is printing. As it stands now, I have to wait for it to happen."

"We work in DOS 5.0 and Windows and will go forward with Windows. I'm generally in about five or six applications at a time, and Windows makes it easy to switch between applications, check E-mail and cross around."

►Wayne Dunn, manager, end-user support, Massachusetts Bay Transit Authority, Boston.

Current operating system: Migrating to OS/2 2.0.

Comment: "People here are transforming the way they do business, and I'm getting demand for high-end graphics and sharing information across platforms. I

needed a 32-bit operating system that was fully graphical object-oriented and truly multitasking."

"OS/2 2.0 gives me the flexibility to migrate to new applications when I want to and continue to use the ones I own already."

"Because of all those factors, OS/2 was the only one. Unix is powerful, but it wasn't a fit, given that users in this particular department were doing a lot on PCs. Unix didn't have a graphical environment at the same cost."



►Bill Wostenberg, systems supervisor, technical support, health care department, Southern California Edison, Rosemead, Calif.

Current operating systems: Macintosh, DOS/Windows, OS/2 1.3.

Comment: "I would like to see a graphical user interface and user-friendly comprehensive help facilities. Some of the common utilities that people use day in and day out — such as file compressions, backup to file and tape — should be built in."

"Ideally, the operating system should make it easy to locate data that resides anywhere on your disk. In this day and

age, there should be some built-in peer-to-peer networking. We see it in the Mac but don't see it in DOS, Windows and OS/2."

"I see our direction going more toward OS/2 because we are downsizing applications to a client/server architecture in a LAN environment, and OS/2 is a better operating system to support client/server relationships."

"A lot of people are talking about Windows NT, but we feel that NT doesn't exist and won't exist until Microsoft officially releases it to the market and it is bug-free."

►Sally Atkins, consultant, large financial company in Boston.

Current operating system: DOS/Windows.

Comment: "We're using DOS and Windows, which will lead us in an NT direction because Microsoft has positioned NT as a growth path for Windows. We need scalability, which means I can use it on my portable up to my supercomputer and be able to port programs. If we start with a new line of business and write code for five customers, that code can be scaled up if a product of ours takes off. We also need distributed services, such as a naming, timing and remote procedure calling." •

Opinion

Go GUI? Well, maybe not



At least once a week, somebody asks me, "Should I switch to a GUI-based operating system?"

As I write this article with Lotus' Ami Pro

3.0, a Windows word processor, using a \$10,000 behemoth 486 50-MHz machine I built that runs Microsoft's Windows 3.1 with only acceptable speed, the answer I give surprises even me.

Maybe. Maybe not. It depends on what you do.

The gang around the GUI campfire is growing, and I'm one of the guys tossing on logs. I use Windows 3.1 daily, and I wouldn't give it up.

DOS is a clunky, ugly dinosaur. Its limitations are legendary. Yet I suspect we're rushing into Windows and other GUIs for silly reasons. They're cute, with smiley faces and consistent menus, and if you're a novice, they might be easier to learn from scratch. And sure, you can share

data seamlessly among most GUIs, even across different platforms.

It's true — DOS applications are loners. Most GUI packages are built from the ground up to talk to each other. Windows NT, still fantasyware, promises tight integration between applications and the operating system. Exciting, yes.

What's important?

The question is, do you need to do any of that? If your job really calls for either Object Linking and Embedding, IBM OS/2's object-oriented document management or Next, Inc.'s Display Postscript, buying the exotic, high-horsepower hardware you must install to run a GUI could justify the stiff price tag.

But many tasks don't require seamless data sharing or flawless typesetting. Passing a Lotus 1-2-3 spreadsheet around the network suffices. You may just need to do business — not publish *USA Today*.

To get back to the question, sometimes I reply, "No. You could probably get by with a non-GUI operating system." My own personal preference is Quarterdeck

Office Systems' DesqView 386.

But for DOS users, DesqView can still be a better deal. It's true that Windows, the Apple Macintosh, the Next system and OS/2 are prettier, and in many ways they're all more technically advanced. Not to mention, almost every application vendor is aiming the big guns in development at programming for Windows and, to a lesser degree, the other GUIs.

For about half the random-access memory demanded by the GUIs, DesqView provides crash protection, multitasking and serial communications. It protects DOS applications from one another with user-assigned degrees of protection, preemptively multitasks them and handles serial communications well enough that I've been able to format floppy disks while Qmodem Pro was getting my E-mail.

Like the GUIs, DesqView will force your DOS applications to talk to one another. You can paste data from a 1-2-3 spreadsheet into WordPerfect with a few keystrokes.

There's even a "clipboard" to which you can append. It doesn't provide you with "active links," like most of the GUIs do; it's a simple cut and paste of what's on the screen at the moment.

DesqView handles protected-mode applications and software that wants expanded memory with equal aplomb. In

the two years I've used it, no ill-behaved application except Windows 3.0, running in a window, has crashed DesqView. There's a cruel irony there, I think.

It's also a good environment for software development. DesqView will run a compiler in the background, and if you want to stop the program to get full use of the system, you can "freeze" it from the DesqView menu and later restart it when you're ready — with no loss of data.

Simplicity a key

Best of all, DesqView is not resource-hungry. You can run it on a 386SX 16-MHz machine with 4M bytes of RAM. And with simple hardware like that, you can load at least three or four applications.

A Windows machine needs at least 8M bytes to be useful. OS/2 2.X and Windows NT do (and will) realistically need even more RAM. A Unix machine starts with 16M bytes and goes up from there.

So, before you haul your company's DOS power users into the GUI world, take a look at DesqView 386. Your employees get to keep the DOS tools they know and love and get all the benefits of Quarterdeck's memory management, true multitasking and solid crash protection — from a package that takes a meager 500K bytes of disk space. That's roughly 11M bytes less than Windows and about 40M bytes less than OS/2 2.0. •

Written by Todd Henschell, a freelance writer in Burbank, Calif.

Desktop Operating Systems

Windows NT: Meets user expectations, but lacks performance, application and networking features



Computerworld's Firing Line is an evaluation based on interviews with major users at corporate and educational installations. The product under evaluation is being used in live application environments.

Windows NT

■ The current beta-test version of Microsoft Corp.'s Windows NT, shipped in October, meets user expectations. But key pieces have yet to ship, and performance and compatibility can't be judged until the final release of NT, scheduled for later this year.

■ Users said they are concerned about compatibility with Novell, Inc.'s NetWare, device driver support and performance relative to Windows 3.1. They also said they are mystified by vague pricing statements made by Microsoft.

With more than 10,000 beta-test copies in the field, Windows NT is widely anticipated to be the inheritor of the DOS desktop. Because of this prerelease hoopla, *Computerworld* went outside of its usual practice of evaluating production versions of products and instead reviewed the current beta-test re-

lease, which became available in October 1992.

With four months' experience evaluating this version of Windows NT—and after working with previous versions—the four users in our evaluation participated in a teleconference with *Computerworld* editors and Bill Bluestein at

Forrester Research, Inc. in Cambridge, Mass. They also documented their findings in a questionnaire designed with assistance from Howard Rubin Associates, Inc. and Technology Investment Strategies Corp.

All of the users were running Windows NT on 486-based PCs with a minimum of 16M bytes of random-access memory.

Reliability

The evaluators reported a relatively low failure rate considering they were dealing with a beta-

test product.

Manufacturer 1 (Windows user): "It has not failed in and of itself. It's hard to determine whether the failures that have occurred are more faults of the application or of NT."

Manufacturer 2 (mainframe user): "We've had a number of problems with network hangs, but the rate has only been every two to three weeks, which is not severe."

Telecommunications company (OS/2 user): "Even for the beta versions, it has performed pretty well in a development environment."

Performance

Because they were using a beta-test version, the evaluators did not stress-test the operating system to determine production performance.

But in general, the users said NT was running as fast as Windows 3.1 in development work and as fast as they expected for a beta-test product.

Manufacturer 1: "It's running neck and neck with Windows 3.1."

Manufacturer 2: "We did have some problems with the July beta release, but they've apparently fixed that. This version is as quick as we need it to be. I don't think people should migrate to this platform just for performance. It's the multitasking that's important."

Facts about Microsoft's Windows NT (beta-test version)

- First DOS/Windows-compatible 32-bit operating system.
- Multitasking, multithreading processing.
- Scalable architecture supports Intel Corp., Digital Equipment Corp. and MIPS Technologies, Inc.
- Approximately 10,000 beta-test sites; midyear rollout expected.



Technical support

The evaluators reported little need for technical support largely because the software came with extensive documentation. The documentation could have been better organized, they said, but overall, the users found the answers they needed on their own.

Manufacturer 1: "We've had no need to call Microsoft. I browse CompuServe, but mostly it's a case of information overload. I sometimes feel like I'm going where no man has gone before when I search for the answers."

Manufacturer 2: "We had to call on one problem caused by an old network card. The support people were prompt and helpful. The information supplied with the product is overwhelming."

Telecommunications company: "They have given us a lot of personalized support, even to the point of taking a couple of our folks up to the porting lab they have in Redmond, Wash. There has been some technical arrogance in the past on their part. There was some technical elitism, and we had to have a heart-to-heart talk about where we were going."

Ease of installation

Installing the software for NT was not difficult. Users reported taking anywhere from an hour to a day to get the system running, depending on the complexity of their configuration.

Manufacturer 1: "I had to use the old DOS installation procedure because the CD-ROM installation doesn't work with my Sony drive."

Windows NT, page 76



Ratings are based on user expectations on a 1-to-5 scale, where 1 is below expectations and 5 is above expectations. Ratings are presented in order of importance to users. Unix System Laboratories, Inc.'s System V Release 4.2 ratings are based on a separate user evaluation conducted November 9, 1992.

Microsoft's Windows NT (Beta-test version)	USL's Unix System V Release 4.2
Overall rating	Overall rating
3.6	4.0
Reliability	Reliability
4.0	4.5
Performance	Performance
3.5	3.0
Technical support	Technical support
3.3	4.3
Ease of installation	Ease of installation
2.8	4.5
Ease of programming	Ease of programming
3.3	3.8
Ease of conversion	Ease of conversion
3.0	3.3
Ease of use	Ease of use
4.3	4.8
Range of services	Range of services
3.5	4.2
New features	New features
4.5	4.3

Desktop Operating Systems

Windows NT users say they are concerned about vague pricing and compatibility with NetWare

CONTINUED FROM PAGE 75

But it was simple."

Manufacturer 2: "Whenever we deal with an Intel Corp. product, we expect to invest some time in getting it set up. When we get deeper in to the LAN area, it will be more difficult."

Telecommunications company: "I expected to be able to take the CD installation they gave us and load it and have it up and running in a day or two. We achieved that. Our experience with OS/2 was very different. We always seemed to need additional tools to get it going."

Ease of programming

There is a learning curve, the users warned. Programming with NT is more complex than previous versions of Windows because of the number of application calls and options.

Manufacturer 1: "There is so much to learn before you can become productive. The concepts are straightforward, but there's a wider scope of what's available."

Manufacturer 2: "My view is based on working with a mainframe operating system, and it's as easy, if not easier, to use than that. I had a small annoyance with waiting for multiple events to be

Installation descriptions for users who evaluated Microsoft's Windows NT (beta-test version)				
	Telecommunications firm	Manufacturer 1	Manufacturer 2	Petroleum firm
Version	OCTOBER BETA	OCTOBER BETA	OCTOBER BETA	OCTOBER BETA
Hardware platform	486 PC	486 PC	486 PC	486 PC
RAM	16M BYTES	16M BYTES	16M BYTES	16M BYTES
Time in use	4 MONTHS	2 MONTHS	4 MONTHS	2 MONTHS
Application	CUSTOMER SERVICE	SOFTWARE DEVELOPMENT	MAINFRAME CONVERSION	NO COMMENT
Comparison system	OS/2	WINDOWS 3.1	TANDEM'S GUARDIAN	NO COMMENT

completed. If you aren't careful, you can get stuck in memory."

Telecommunications company: "So far so good, but we are very early in the conversion. There are a lot of development tools coming out that look promising."

Ease of conversion

Users reported that Windows NT's ability to emulate their current en-

vironments and run previous applications was hampered by the lack of device drivers.

Manufacturer 1: "Microsoft has a difficult task obtaining third-party support for drivers for all the DOS-based applications. I had trouble with Aldus Corp.'s Photo-styler."

Telecommunications company: "The typical Microsoft office applications run without any problem. Our experience in porting the current code for our custom applications has been pretty good so far. We have been able to port a good part of the code using Microsoft's porting tools with very little manual intervention."

Ease of use

Users said Windows NT was as easy to use as previous versions of Windows from an end-user standpoint.

They also said it will be easier for those familiar with character-based environments after they become used to dealing with a graphical system.

Telecommunications company: "NT looks like Windows 3.1, so everyone is familiar with the environment."

Range of services

For the most part, they were satisfied with the number and kinds of utilities provided, but the evaluators noted that some monitoring and diagnostic tools were lacking.

Manufacturer 2: "I have some problems tracking activity on different threads and determining the state of the threads. The package needs more display and diagnostic tools."

New features

Perhaps the most important new feature of Windows NT compared with previous versions of Windows is more robust multiprocessing and memory management.

Manufacturer 2: "Multithreading is a godsend. We use it for asynchronous communication with the mainframe. Once in a while, the tasks behave choppy."

Memory management was also improved in NT compared with Windows 3.1.

Manufacturer 1: "I spent so much time in Windows 3.1 wrestling with memory management. It has much more difficult memory allocation limitations. Windows NT is almost painless in comparison."

Manufacturer 2: "NT is somewhat more efficient. It still has some relics of the 16-bit address space."

Price

Based on reports of prices ranging from \$300 to \$500 for a new operating system and \$200 for an upgrade, Windows NT might not be as widely distributed as the users would like.

Those who were upgrading from Windows 3.1 or OS/2 thought the price should be much lower — under \$200 new and \$100 for an upgrade.

Networking

All of the evaluators thought support for Novell NetWare would make or break Windows NT. They considered Microsoft's waffling on the issue to be "political" and uniformly said they believe NetWare will eventually be supported in Windows NT.

Manufacturer 2: "They have to add in NetWare support. If NetWare support did not show up, we would have to think real hard about the viability of the product."

Forrester's Bluestein: "If there is no NetWare support, there will be no acceptance of NT."

Written and compiled by Michael Sullivan-Trainor, CW research manager.

Microsoft responds

The following answers were provided by Microsoft officials in response to issues raised in this evaluation.

• **Deployment and upgrade costs:** Our customers tell us they will deploy Windows NT widely through their corporations on high-end desktops and servers, but neither they nor we expect Windows NT to become the high-volume version of Windows. For those high-end desktops that are going to be upgraded from Windows 3.1 to Windows NT, we will offer special upgrade pricing.

• **NetWare support:** Windows NT was designed to work in multiple networking systems and to provide uniform user interfaces and programming interfaces over these different networks. Since the October beta test, Novell has demonstrated their NetWare requester for Windows NT at Interop and Networld and has made the beta version available on CompuServe.

• **Device driver support:** The first beta supported more than 300 PC systems, 200 printers, display adapters for VGA, SuperVGA, XGA, local bus and similar numbers of other peripherals. The next beta test will more than double the number of devices supported.

• **Developer learning curve:** The feedback we have gotten from developers is that going from developing today's Windows applications to new, 32-bit Windows applications is not hard. The programming model for 32-bit Windows applications is the same, and all the basic services are the same.

COMPUTERWORLD



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- Freeport McMoran, Inc.
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- Guilford Mills, Inc.
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- International Paper Co.
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- Lever Brothers Co.
- Long Island Lighting Co.
- Miles, Inc.
- Massachusetts Mutual Life Insurance Co.
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- Mellon Bank Corp.
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- New Mexico State University
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Digital's ability to offer a high-performance PC that's also affordable is the result of taking a hard look at all aspects of the process — from design through to delivery and support. This attention to detail allows us to offer the highest-quality product at the lowest-possible price.



Take an INSIDE LOOK

Attention to Detail Is the Secret of Digital's PC Success

It's enough to make your head spin. You can easily become bewildered when confronted with the deluge of PC models and product lines offered on the market today. The main question you may be asking yourself is: Which PC do I buy to satisfy all my business needs?

Your requirements include compatibility, reliability, and service. In addition, you want assurances that your PC investment will increase business productivity — without a lot of hidden costs attached. You ask one more question: Is there a company out there that can do all this and more?

The answer is yes. The company is Digital.

A Complete Package

Service, support, and security. You get all three when you purchase a PC from Digital. We provide you with the networking expertise, the service capabilities, and the complete backing of a global organization that does business in many countries around the world. We've cornered the market on consistency and quality. According to a study published by Computer Intelligence, a market research firm in La Jolla, CA, Digital was the fastest growing PC vendor in 1992.

How do we do it? It's simple. Digital sets and maintains high standards of quality by starting small — at the component level. For example, Digital offers outstanding PC video performance by using the latest video chips from S3 Incorporated, one of the leaders in

the field. These chips interface directly from the motherboard to the local bus, freeing up the powerful CPU for other tasks.

Other details that emphasize the quality of Digital PCs include a vacancy socket into which you can plug an Intel Corporation clock doubler chip to double the CPU frequency. And there's a variable-speed fan to make your working environment quieter.

Digital has also implemented a production process that helps to ensure customer satisfaction. Bringing the final assembly point closer to the customer makes it easier to respond quickly to your needs. That's why we ship all the components — skins, CPU, motherboard, disk, and floppies — to local integration centers for final assembly and testing.

We Work Hard to Deliver Competitive Prices

Digital continues to look at the costs involved in every aspect of our PC business in order to provide you with the very best competitive prices.

Because the PC business is such a low margin business, it's extremely important to keep inventory, pipeline, and technology obsolescence costs under control. We've accomplished this in a number of ways, such as implementing a modular design approach. Simply put, we can redesign a PC by replacing only a tiny portion of the CPU card. The box, the power supplies, the floppies, the hard drives, etc., remain the same. Total redesign becomes unnecessary. And, product quality and consistency is maintained.

Changes in traditional business practices have also helped Digital become a primary player in the PC market. For instance, we continuously negotiate the price of individual PC components and the PC itself in order to maintain competitive pricing.

Plus, Digital has implemented a production cycle to better answer customer needs. Specifically, our engineering group is divided into two teams, so that we're prepared to deliver new products every six months.

In Store for the Future

Consistently delivering quality products and services — that's Digital's philosophy for today and for tomorrow. This quality is offered through a number of computing choices to suit all your desktop requirements. We will continue to expand our line of industry-standard products, plus introduce products based on our new Alpha AXP technology. These options provide power and performance today and a cost-effective pathway to future computing.

In addition, Digital will continue to offer a product "cost of ownership" plan to help companies lower costs while increasing productivity.

The bottom line? Digital is the first full-line, full-service company to sell PC hardware, software, and service. We deliver a quality product at a competitive price — plus technical service and support that is unrivaled in the industry. In other words, our competitors may offer a "box," but we offer the complete PC solutions package to answer all your current and future business requirements.

Need Information on Digital PCs? Access Is Right at Your Desktop

Digital makes it easy for you to do business by offering a variety of PC information and ordering channels — at your fingertips.

- By calling Digital's DESKTOP DIRECT line, you can get all your questions answered by trained personal computer experts. Ordering can be completed over the phone, too. Simply dial 800-PC-BY-DEC (800-722-9332) for assistance.
- For online information and ordering, access Digital's Electronic Connection

by dialing 800-234-1998 at 1200 to 9600 baud, from any Digital-compatible terminal or PC.

- If you are a member of CompuServe, you have access to a host of PC information. The Digital Equipment Corporation PC and PC Integration (DECPCI) forum on CompuServe covers a wealth of valuable information on DECpc systems, PATHWORKS PC networking software, EtherWORKS network interface cards, applications, and services from Digital.

Digital Gives You License to *Move* Your Applications — and **SAVE MONEY**

The way Digital does business
is as important as the products
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That's why we're offering
licensing flexibility.

It allows you to make the most
effective use of technology,
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IT investments.

Digital's licensing flexibility — a business practice that is the first of its kind in the industry — provides you with the option to move your software applications between hardware platforms without paying additional licensing fees. This flexibility helps you make more strategic use of computing assets and at the same time simplifies your migration to other hardware platforms, including Alpha AXP.

Digital's user licenses provide cross-platform mobility by allowing the use of a layered product across all platforms running the same operating system. For instance, a Personal Use license for DEC Fortran for OpenVMS can be used on either a VAX or an Alpha AXP platform. You benefit by being able to move the user licenses between systems you already own and those you acquire in the future. No additional paperwork or license fees are required.

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In addition, companies that wish to evaluate a software product before purchasing can do so simply by acquiring a few user licenses.

All in all, the mobility provided by this flexible business practice not only cuts costs, but also lets companies make an application investment today on an available platform — with complete confidence of full investment protection for the platforms of tomorrow.

For information on Digital's award-winning licensing practices, call Allen Belancik, Marketing Executive, Corporate Business Practices Group, at 603-884-2372.



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Paper costs are up. Productivity is down. Time is money — and both are wasted if your office is still utilizing manual procedures to retrieve information.

Content-Based Retrieval (CBR) solutions from Digital save you both time and money by making your information accessible online. With its ability to search and retrieve documentation, reference materials, customer files, and other information, CBR technology can reduce the time it takes to recall only the information essential for making operational and strategic decisions.

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Rambyte Consulting Company, a Digital Authorized Reseller, can help you select the most appropriate CBR tool. To maximize your investment, services such as technical and end-user training, systems integration, and ongoing support are often included in the purchase price of software.

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Digital has announced an expanded program for software developers to help ensure that applications from different companies will work together better. The NAS Advantage Application Program creates a new level of recognition for third-party and Digital applications that display maximum conformance to the industry standards embodied in our NAS family of software products.

Who benefits from such a program? Both developers and end users. Developers of qualifying applications can participate in added promotional activities that highlight their more complete open systems applications. End users are assured that software carrying the NAS Advantage Application designation will work more smoothly and easily with a host of other applications.

For information on the NAS Advantage Application Program or how to qualify, call 603-884-8100.

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Now you can get the same presentation and windowing capabilities provided by more expensive workstations. The VXT 2000 X Window terminal gives you high-resolution graphics, data security, and ease of use, while eliminating desktop management — all this at about half the cost of similar standalone workstations.

Engineers porting applications running on UNIX and OpenVMS can enhance the power of a single Alpha AXP processor by accessing it through VXT 2000 X Window terminals — combining fast, robust computing power with lower cost-per-seat.

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Who Benefits from GIS Solutions?

Benefits garnered from GIS solutions cross a range of industries, including:

- Government agencies, using GIS for environmental impact evaluation, emergency response systems, resource and facilities planning, among other services.

"Taking the integrator approach, Digital has diligently built a solid GIS business, and the company's market strength is a reflection of that commitment."

KATHRYN HALE,
SENIOR INDUSTRY ANALYST
DATAQUEST INC.

- Utilities (electric, gas, and water), implementing GIS solutions to help manage data related to the physical network (pipelines, wires, etc.) used to deliver services.
- Telecommunications, utilizing GIS to manage information associated with land-based telephone lines or wireless cellular towers.
- Commercial sector, using GIS to manage inventory and distribution and for demographic analysis.

Digital Makes GIS Work for You

We do so through a combination of systems integration expertise, leading-edge technology, and an extensive portfolio of third-party software solutions.

As a matter of fact, more than 50 of the leading GIS applications run on Digital computers — from PC to mainframe.

Our networked, integrated GIS solutions make geographically defined data accessible not only to specialized mapping

functions but to management, financial, project planning, scientific, and engineering functions throughout an organization. As your single point of systems integration expertise, we provide the complete solution — from integration to training, from third-party software solutions to service and support after the sale.

More than a dozen of our strategic GIS software partners have committed to and are porting critical applications to the Alpha AXP platform. In addition, for a limited time, many of these vendors are offering significant discounts with purchase of Alpha AXP systems as part of our Alpha AXP GIS campaign.

Alpha AXP Systems Meet GIS Demands

From terrain modeling to mapping to image scanning — GIS is graphics intensive. Many agencies deal with terabytes of data on a daily basis. That's why it's imperative that a truly high-performance system be implemented

for GIS solutions. Digital's Alpha AXP systems deliver the high performance needed at an affordable price.

Based on a 64-bit RISC architecture, Alpha AXP systems provide both the speed and the addressability

required for simple to complex GIS applications. What's more, the Alpha AXP platform is available on multiple operating systems. This leading-edge technology provides a strong base in which to incorporate GIS solutions with new technology such as multimedia and animation.

The Alpha AXP architecture is also important to the GIS market in terms of investment protection. Not only can Alpha AXP provide high performance today, but it also provides a 25-year growth path to future computing.

For information on Digital's GIS solutions or to receive a FREE GIS brochure, call 800-DEC-INFO (800-332-4636), press 1, and reference ext. 650.

Digital Powers a Most Innovative U.S. GIS

What began as a solution to meet certain specific environmental needs in the Commonwealth of Massachusetts has evolved into a versatile, efficient, interagency tool that puts the state at the leading edge of environmental achievement.

MassGIS serves 2,500 environmental agency employees and is powered by a Digital computing system running the ARC/INFO GIS product from Environmental Systems Research Institute (ESRI). Each year, more environmental offices are integrated in the wide area network with relative ease. A powerful VAX system handles the data in the equivalent of a mainframe environment, with positive results. According to Charles Anderson, Jr., senior biologist with MassGIS, "The system has provided a very stable, reliable platform for the GIS software."

See Digital's GIS Solutions in Action

Where can you see Alpha AXP systems running some of the leading GIS applications? At the GIS in Business '93 conference and exposition — sponsored by GIS World, to be held March 7-10 at the Sheraton Boston Hotel, Boston, MA. Be sure to stop by Digital booth #302 to see a variety of commercial GIS solutions, such as store location planning applications and demographic analysis.

In addition to the conference, Digital will host a series of GIS solutions seminars in the April to June 1993 timeframe.

For information on Digital's participation at the GIS in Business '93 conference and exposition, call 508-467-7203.



Digital Offers You Choices

THE BUSINESS ENVIRONMENT OF THE '90s

challenges organizations to work faster, better, and at a lower cost than ever before. Styles of computing that suit large, monolith, routine batch jobs cannot sustain the free flow of information and resources required by businesses today.

Companies need the freedom to provide their employees with access to information when, how, and where they require it. Fortunately, this need coincides with a dramatic increase in performance and a downward turn in the price of computers. Digital helps you take advantage of this price/performance — enabling you to put powerful information tools into the hands of your business professionals.

Our strategy is to provide you with a more flexible and open future. We'll help you plan, design, implement, and manage information environments that are cost-effective — from initial purchase through ongoing management and change.

Enabling Your Company to Work As It Wants to Work

Providing your professionals with the freedom to access information when, where, and how they need it requires the foundation of a disciplined, standards-compliant environment. Whatever your current starting point, Digital can help you quickly and efficiently achieve a standards-compliant environment that is open to the best components now and in the future.

Your professionals use desktop units and applications of choice, benefiting from behind-the-scenes disciplines that enable transparent data flow across multiple vendors' clients, servers, and applications. Digital delivers open computing environments that provide mainframe levels of performance, functionality, reliability, security, and integrity — but with far more flexibility and at much less cost.

Digital offers you the freedom not only to choose the best information tools and products, but also to orchestrate and adapt these into a whole that best suits the way your company wants to work. Take

advantage of our unrivaled depth and breadth of connectivity and integration tools, products, and services. We provide:

- **Worldwide Consulting, Training, and Systems Integration Professionals**

Our experts work with you to manage and balance the people, business, and technology dimensions of distributing information throughout your business.

- **Multivendor Integration**

You choose the best components to serve your business — from desktop to data center. We can integrate and support almost any client or server your company is likely to own now or in the future.

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- **Unbounded Capacity at Far Less Cost**

Utilizing the world's fastest 64-bit RISC microprocessor, our Alpha AXP family of open server and desktop systems give you unbounded capacity — at a fraction of mainframe cost.

- **Take Advantage of Our Experience**

Digital pioneered moving information out from the data center to work groups — whether they're in the same office or around the world. We'll help you achieve the most flexible and cost-effective approaches to your information requirements — today and tomorrow.

For more information on Digital's computer downsizing solutions, call 800-332-8228.

What drives companies to move to more cost-effective computing environments? Two reasons. Not only do you want to increase the payback of your information technology dollar, but you're also looking to increase the productivity of your front-line professionals. Digital helps you do both.

Libbey-Owens-Ford Profits from Digital's Downsizing Solutions

Libbey-Owens-Ford Company's Auto Glass Replacement (AGR) Business Unit has added 69 service centers since 1988, and plans to establish 100 by the end of 1993. This continent-wide service network — including AGR's three giant depots — supplies local auto glass replacement shops that serve customers throughout the U.S. and Canada.

Building market share with this fast-growing service challenges AGR to meet market demand for quick response and competitive pricing by dramatically cutting distribution time-to-market and cost.

These goals drive AGR's move from an in-house application on an IBM mainframe to a Digital client/server environment — an environment that provides nationwide, distributed, real-time inventory management.

Connecting the service centers, depots, and headquarters, the Digital environment integrates and distributes AGR's preferred application packages: Distribution Management from McHugh Freeman Associates, for real-time inventory control throughout the supply chain; and DAI from Distributed Architects Incorporated, for integrated resource planning and order processing in all service centers.

VAX 4000 systems, the field office servers, will link to an Alpha-ready VAX 6620 system at AGR headquarters.

Digital helps The Brookings Institution save over \$1 million.

Digital Helps The Brookings Institution Save Over \$1 Million

With the help of Digital's computer downsizing solutions, The Brookings Institution's Social Science Computation Center (SSCC) has saved a total of \$1.7 million over a six-year period. It spends less annually in areas such as computer maintenance, software, and peripherals.

Digital has been providing Brookings with computing power since 1970. Eventually, the SSCC adopted VAXcluster system technology. But, as PCs assumed an increasingly important role at Brookings, the organization was faced with a dilemma. PC and VAX users needed to collaborate and communicate. Brookings needed to maintain both systems and cut costs at the same time.

The solution? Lower-cost and higher-performance Digital computers are servers to the growing base of PCs and Macintosh systems at The Brookings Institution. These desktop units are integrated with each other and the Digital server via Digital's PATHWORKS networking.

The SSCC has upgraded the VAXcluster system that functions as the server several times, moving smoothly from the VAX 8650 computers down to VAX 4000 systems. Now, with the lower maintenance and electricity costs, Brookings will recoup its equipment costs in two years.

States SSCC Director Jane Fishkin, "The SSCC accomplished this computer downsizing without endangering or impairing the flow of Brookings' most important asset: information."

"The power of Alpha AXP provides the right, high-performance match for our business strategy," says Rick Wagner, Senior Manager, IT, Libbey-Owens-Ford. "We gain industry leading packages, plus the response time we require — all at a far lower cost than a mainframe approach."

In Depth

To: ismanager@bigco.com
From: jsq@tic.com
Subject: What can businesses get out of the Internet?



SPEEDY GLOBAL MESSAGING AND ACCESS TO SOFTWARE AND UNIQUE DATABASES ARE ENTICING COMPANIES TO EXPLORE THE INTERNET

W

By John S. Quarterman

What is made up of more than 8,000 connected networks, has more than 1.3 million connected computers and has users numbering about 8 million? Answer: the Internet.

The Internet, which is the world's largest computer network, has been doubling in size (number of hosts and networks) every year since 1988. Once the exclusive domain of research and education groups, whose interest, among other things, was access to supercomputer power, the Internet is gaining stature among business users.

Companies such as General Electric Co. and Addison-Wesley Publishing Co. are being enticed by the Internet's speedy, low-cost global communications, its appropriateness for collaborative work, its on-line software and its

unique databases (see story page 82). Organizations see the meganetwork as a complement to their existing networks.

"More and more [commercial] organizations are viewing the Internet not in its former context as an R&E 'supercomputer' network but rather as a shared information utility," says Joel Maloff, vice president of client services at Advanced Network and Services, an Internet connectivity provider in Ann Arbor, Mich.

With the low connection cost — often a flat monthly fee for leased line or dial-up access — users can access commercial and noncommercial services in the U.S. and 40 other countries.

Electronic mail is by far the most popular application on the network. While on some networks an E-mail message may take hours or days to reach its destination, on the Internet it usually takes seconds to minutes. Internet mail protocols handle queue congestion and flow control automatically. Images aren't an obstacle because of the Internet's Multipurpose Internet Mail Extensions (MIME). MIME enables an Internet message to encapsulate fax, sound, video and Adobe Systems, Inc. PostScript files as well as character sets for foreign languages.

Through Internet's E-mail, companies can exchange information with other organizations, salespeople, customers and so on with the immediacy needed to conduct day-to-day business. And they can do so on a global basis — oftentimes at a cheaper cost than most other E-mail offerings.

Tom Mandel, senior management consultant at SRI International, a research and

FYI This article's aim is to give business users an idea of what they can get out of the Internet. It is not meant to be about the ins and outs of connection and maneuvering on the network. The following publications can help with the more technical aspects of Internet use:

- *Crossing the Internet Threshold: An Instructional Handbook.* By Roy Tennant et al. (Library Solutions Institute and Press, 1992)
- *The Internet Companion: A Beginner's Guide to Global Networking.* By Tracy LaQuey with Jeanne C. Ryer. (Addison-Wesley, 1993)
- *The Whole Internet User's Guide and Catalog.* By Ed Krol. O'Reilly & Associates, Inc., 1992)
- *Zen and the Art of the Internet: A Beginner's Guide.* By Brendan P. Kehoe. (Prentice Hall, 1993)

The Internet

CONTINUED FROM PAGE 81

consulting firm in Menlo Park, Calif., says the Internet's mail function enables more efficient, frequent and inexpensive message exchange than was possible before between SRI's California and London offices.

Previously, Mandel's department exchanged mail with its foreign office by having a machine in Menlo Park call a modem on a local-area network in London. Because of the cost of a transatlantic phone call, messaging British staffers occurred sporadically. But Mandel and his group switched to a public access Internet system in London, resulting in more regular communications.

Costs came down because Internet services are carried over the Transmission Control Protocol/Internet Protocol (TCP/IP), which multiplexes mail messages (and

other services) across common links. This maximizes bandwidth use, which minimizes cost and permits continuous connection.

Notebook vendor Tadpole Technology, Inc., with headquarters in Cambridge, England, and offices in Austin, Texas, San Jose, Calif., Dallas, New York, Washington, D.C., and France, keeps everyone together through the Internet. "Even when the salespeople are traveling, they carry a notebook and [connect to us through the Internet] from the customer premises, their hotel room or even from the airport lounge," says Jim Thompson, portability scientist.

Tom Stone, senior editor at Addison-Wesley Computer Science Division in Reading, Mass., says with E-mail over the Internet, correspondence with authors that used to take a week can be finished in one day.

Also, with a heavy travel schedule, use of the Internet allows him to keep up with correspondence while away from the office.

You've got it!

How do you know whether your machine is on the Internet? If you can use the Internet FTP to retrieve files from machines such as nic.ddn.mil, ftp.uu.net, or ftp.psi.com, you are on it.



"I call E-mail over the Internet 'productivity software,'" says Raj Manandhar, research assistant at the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. Manandhar has used the system to correspond with software technical support staffs. He routinely sends bug reports and receives fixes and explanations from software developers.

Mailing lists, newsgroups

Business users are not confined to one-to-one communications, however; group information exchange happens through the Internet's slew of mailing lists and newsgroups. Mailing lists enable a user to send a single mail message to a mail alias. Software then automatically sends the message to everyone on the list. Organizations have used mailing lists, for instance, to announce new products to their on-line customers.

The Internet is the biggest carrier of Usenet newsgroups. Members of newsgroups receive messages and news articles according to their specific group profile.

With mailing lists and newsgroups, not only do customers have the option of getting information such as problem or benefit reports directly from individual customers, but firms can also sponsor customer mailing lists or newsgroups. In this way, they can keep abreast of what their customers need and want by posting questions and collecting responses.

For example, certain major newspapers, such as the *Houston Chronicle*, *The Village Voice*, the *New York Times* and *The Economist*, query readers on their interests or ask them specific questions that might help with a story. "I can post a question on various lists or groups and in 24 hours have several excellent answers," says Dan Gillmor, regional affairs writer at the *Detroit Free Press*.

Companies can also receive information from experts on a variety of topics. Gillmor says he prefers the Internet to other services such as CompuServe because it "contains the narrower specialties." For instance, there is a geographic information systems mailing list as well as others that are "populated with real experts," he says. "It's a tip sheet, and it's full of sources. Not a bad resource."

Businesses may find it useful to join mailing lists to stay on top of general issues affecting their industries. For instance, there are lists associated with topics such as technology transfer, Japanese business studies and the oil and gas industry, which includes a daily posting of oil prices financial companies may need to make investment decisions.

The newsgroup setup tends to be more efficient than mailing lists

Play it safe

Because the Internet had its roots in the open and information sharing world of academia, security has typically taken a backseat. But this is an area of concern for many business users sending mail over the network.

Password protection is the common security measure on the network today. You can also set up other defenses, including prohibiting incoming network connections, limiting incoming connections or prohibiting incoming connections for certain hosts or networks for each service.

In the works is a security feature known as Privacy Enhanced Mail (PEM) that should protect users even further. PEM uses public key encryption to ensure that users know who sent a mail message. The mail message itself can be encrypted to keep anyone else from reading it.

—John S. Quarterman

Passing the buck

Smart users let the Internet do the work

Many firms have extensive research needs, whether it's intelligence gathering on competitors, research to help create a new product or finding out the latest on privacy laws. The Internet lets employees check, search and retrieve information, all without getting out of their chairs. The Internet's various indexing and search aids (see story page 83) can help locate these resources.

Quiet, please!

The Internet Telnet protocol, which connects you to a remote machine and lets you log on just as if you were on a directly connected terminal line, lets you search through the Library of Congress' catalog (telnet.dra.com).

One company that finds library research over the Internet key to its product developments is General Motors Corp., which uses the network to get at university and government libraries for a lot of its car research.

From Cary, N.C., Paul Betz, copy chief at Oxford University Press, is using the Research Libraries Information Network databases to do research for the *American National Biography*, according to Naomi Courter, network services specialist at the Concert network. The work, to be published in 1995, will consist of 20 volumes containing 20,000 articles about Americans from the Viking times through 1990.

Other on-line libraries include those at Harvard University, the University of California and the University of Texas.

You want data, we got data

There are many specialty databases on the Internet with information on everything from molecular biology to agriculture.

Wide-Area Information Servers (see story page 83) let users search 400 databases located on servers. Users can access data on molecular biology, recipes, ZIP codes or science fiction reviews.

Dialog made a name for itself by providing databases and sophisticated retrieval mechanisms using dial-up telephone and X.25 connections. Last year, Dialog connected to the Internet.

Searches of patent databases are also possible over the Internet. Access to state-of-the-art information—and the desire to get knowledge about competitors' research and development strategies—has speeded up patent research by up to 40%, according to Advanced Network and Services. One company claims it will save at least \$15,000 in annual searching and legal fees by going through the Internet. Additionally, it may be able to double or triple the number of patents for which it applies. Bringing these products to market could increase annual revenue by as much as 20% to 30%. The result could be \$10 million in potential new business.

Books! Books! Books!

At least two projects are in the works for putting books on the Internet for free: the On-line Book Initiative (OBI) and Project Gutenberg. Because of copyright concerns, these will concentrate on books whose copyrights have expired. Also available will be standard references and Internet material. For instance, the OBI offers the Electronic Communications Privacy Act of 1986 on-line.

Also, the Online BookStore for-pay service offers the Internet community full texts and book illustrations and gives royalties to authors or electronic rights holders.

In Depth: The Internet

users of other machines.

FTP enables users to connect to other computers and perform certain actions, such as listing the files in a directory and copying files back and forth. The Telnet protocol connects users to a remote machine and lets them log on as if they were on a directly connected terminal line.

Because it is suitable for collaborative work, the Internet has been a boon to far-flung businesspeople, writers and authors who need to pass draft documents and comments back and forth by E-mail and FTP. The Internet enables "joint writing of papers, sharing of data, coordinating—you name it," says Dick St. Peters, physicist at General Electric Co.'s corporate research and development group in Schenectady, N.Y.

Easy editing

Paul Betz, copy chief at the Oxford University Press in Cary, N.C., coordinates text from 7,000 contributors in collaboration with advisory editors and the general editor, according to Naomi Courter, network services specialist at the Concert network, a North Carolina statewide data network connected to the Internet.

Addison-Wesley's Stone says potential authors submit proposals on-line, which he reviews on-line. By using mail and FTP, Addison-Wesley can now handle copy editing without any paper passing between author and editor.

"We used the Internet extensively to exchange drafts and iterations of our book, writing and pro-

Hodgepodge of info

Some of the commercial Internet connectivity providers support large anonymous FTP servers that collect information from many sources. Information available from these servers includes software, Supreme Court decisions, book publisher catalogs, network maps, technical reports on protocol specifications and several TCP/IP implementations. These servers include ftp.psl.com, which is run by Performance Systems International and ftp.uu.net, which is run by UUNET Technologies.



ducing it in two months' time, from contract through delivery to the publisher," says Laura Fillmore, president of Editorial, Inc. in Rockport, Mass., which produced *The Internet Companion: A Beginner's Guide to Global Networking*.

The use of the Internet to collaborate on producing a book, business document or any other related report saves time, eliminates express mail expense, does away with error-prone manual transcription steps and reduces the need to exchange floppy disks.

Free software

Beyond mail-based capabilities, companies can use the Internet as a source for state-of-the-art software that is often available at no charge.

Using the anonymous FTP convention, companies can retrieve software from publicly available files. Anonymous FTP enables users to retrieve files with FTP without having a login account on the Internet server.

Energy company Unocal Corp., for instance, uses the Internet to get state-of-the-art software from Caltech for modeling seismic data, according to Peter Ho, network systems engineer at Unocal in Brea, Calif.

One Houston company says a free software package it got off the Internet was worth more than the cost of its 56K bit/sec. Internet connection. Such a connection usually

costs about \$12,000 a year.

GNU Emacs, a popular text editor and formatter, is available without cost on the Internet from the Free Software Foundation. Companies can get it from a machine called prep.ai.mit.edu as well as from [ftp.uu.net](http://uu.net).

GE's St. Peters says his group has used and retrieved "hundreds or thousands" of software offerings from the Internet. Hundreds of people in GE's R&D and medical departments use GNU Emacs alone.

That's not to say GE doesn't give anything back: St. Peters and his group wrote and maintain a software package for research medical imaging that is distributed to medical R&D sites on the Internet. "We use the Internet to remotely log in and help them when they have problems," St. Peters says.

There are approximately 2,000 anonymous FTP servers worldwide on the Internet, including the following:

- For general MS-DOS PC software, look on wsnr-simtel20.army.mil.
- For NCSA Telnet, a TCP/IP package for PCs, try ftp.ncsa.uiuc.edu.
- For general Apple Computer, Inc. Macintosh software, try sumex-aim.stanford.edu.
- For Columbia University's AppleTalk Package, try rutgers.edu.

Vendors are also getting in on the act, cutting down on distribution costs by placing software on the Internet. Apple has made its System 7 operating system as well as early versions of its MacOS available for free by anonymous FTP from apple.com. (But System 7.1 is not available this way.)

Digital Equipment Corp. maintains a large collection of non-DEC-developed software on its gatekeeper.dec.com machine.

.....
In the end, the Internet is not about free software or mail functions or supercomputers or any individual service it offers. The bottom line is that the Internet supports the largest and most directly connected community in the world. It might be to your business' advantage to become a part of that community. *

Quarterman is a partner at Austin-based Texas Internet Consulting, which consults on networks and open systems. He is author of the book *The Matrix: Computer Networks and Conferencing Systems Worldwide* (Digital Press, 1990). Quarterman gathered most of the examples in this article through a single query to business users on an Internet mailing list. Follow-up was also done on-line. He can be reached through the Internet at jsq@tic.com.

Finders, keepers

So many resources are available on the Internet that a slew of index and search services have cropped up to help users. They include the following:

• **Archie:** A service that indexes more than 1,000 anonymous FTP servers worldwide—about 150G bytes of information. Basically, you ask Archie to locate a program or other package by name, and it responds with a list of all the hosts that have it, which directory and file it is in on each host and when it was last updated.

Public Archie servers in the U.S. are in Maryland (archie.sura.net), Nebraska (archie.unl.edu), New York (archie.ans.net) and New Jersey (archie.rutgers.edu).

• **Wide-Area Information Servers (WAIS):** WAIS can index any piece of text and report to you passages that match key words. It lets you search for information in databases located on servers. Users have access to *The Bible*, current weather forecasts, documents about the Internet and so on.

Users can try a WAIS terminal interface by remotely logging on to quake.think.com. Use the username "WAIS."

• **Gopher:** Gopher helps you find the right menu and keep track of the various servers and information sources. Gopher ties all these items together in a worldwide distributed menu system. Archie, certain libraries and many WAIS servers are available through Gopher, as are text files and software packages.

You can get an idea of how Gopher works by logging on to one of the public Gopher sites. Try gopher.uiuc.edu.

Hytelnet: Hytelnet helps you find the right library catalog. This program, which can run on the PC, Macintosh, Unix or other operating system, helps users find the appropriate hosts and login names for library databases. Information is built into menus.

Internet misconceptions

The Internet is owned by the government.

The Internet is owned by approximately 18,000 organizations worldwide, from large corporations to military services and government agencies. The U.S. government was very influential in the development of the Internet but currently owns or funds only a small fraction of it.

Commercial use is prohibited.

Most of the Internet is privately owned and consists of local-area networks inside companies. In fact, commercial connections are growing faster than educational ones. Most wide-area Internet connectivity providers are privately owned and operated and will carry any traffic that users pay for. Some parts of the Internet (including the fastest parts) restrict use to research or education.

The Internet is just U.S.-based.

The Internet extends to more than 40 countries currently, and expectations are that 100 more will come on board. After the U.S., the countries with the most Internet hosts are Australia, Canada and Germany. The countries with the most hosts per person are

Norway, Sweden, Denmark, Finland and Iceland.

The Internet is the same as the Arpanet.

The Arpanet was merely one network within the Internet. Started in 1969, Arpanet was the first distributed packet-switched computer network. In 1977, the Arpanet became one of the Internet's backbone networks, and the protocol research done on the Arpanet was very influential in the development of the TCP/IP currently used on the Internet. Arpanet's technology became obsolete, however, and it was retired in 1990.

The Internet is the same as the National Research and Education Network (NREN).

First, the NREN, which is expected to be the fastest wide-area network on the Internet, does not yet exist. However, interest in creating the NREN has reached fever pitch because one of its proponents is Vice President Al Gore. When (and if) it finally gets here, the NREN will be but one of the thousands of networks on the Internet. The NREN will likely be limited to the U.S.

—John S. Quarterman



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Computer Careers

Job discrimination

Age no barrier, perception is

By Sheryl Kay

■ Who says you can't teach an old dog new tricks? John Parsons, 57, a systems programmer at the Housing Authority of Baltimore, refutes that theory. With absolutely no computer background, he went back to school at age 47 and got a job as an entry-level systems programmer.

"Age has nothing to do with survivability," he observes.

The perception that older information systems professionals may be less likely to adapt to and absorb new systems is a form of age discrimination. But apart from some isolated cases, age discrimination is not a big problem in most IS shops.

"It's the great theoretical argument," says Paul LeFort, a senior partner of information technology at Deloitte & Touche in Chicago. LeFort says he has never observed age discrimination, yet he concedes that because developers spend a lot of time with users, some companies hire younger employees as developers because they're perceived as being more lively and aggressive than older employees.

When to watch out

As with most professions, age discrimination in IS can take place during hiring, promotions, reviews, training and terminations.

Most instances of age bias in IS occur during training and terminations when a company assumes older employees can't learn new technologies. Some firms either don't give them the option to learn or fire them for not knowing.

Where IS age bias occurs:

Hiring: Younger candidate with equal skill sets, education and salary requirements hired over an older one. Rarely happens in IS.

Promotions: Younger employees, perceived to have more energy and a better handle on current management styles, are more likely to be promoted.

Training: Most common form of IS age bias. Perception is that only younger employees can keep technically current.

Terminations: Perception in IS is that an older employee is less able to assimilate new technical concepts and is less willing to do so. When layoffs are necessary, he is first to go.

Jake Waller, 57, retired almost four years ago from the Coca-Cola Co. in Atlanta where he served as vice president of administration and technology. Although he retired under favorable circumstances, he says other, older technical employees at the company were forced out against their wishes. Coca-Cola has not responded to this accusation.

A younger manager with a lower salary came in and "cleaned house," Waller recalls, and in doing so, forced the resignation of a number of individuals in their late 40s who had been with the company more than 20 years. But "the whole thing fell in on him," Waller notes. "He only lasted 18 months, and it took almost four years to shore the organization back up again."

Skills matter, not age

Having recruited IS professionals for more than a decade, Hal Sullivant, president of Linn-Truett, Inc. in San Antonio, has not seen age discrimination in IS: "If there's bias out there, then the companies are hiding it." Sullivant maintains that he has placed many individuals in their 50s.

"If they're good in the boardroom but not technically proficient, yes, there may be [fewer] jobs for them, not because of their age, but because there is only one CIO at any company," Sullivant says.

LeFort notes that some industries actually prefer hiring seasoned IS professionals. "Financial services or airline reservation systems, for example, require specialized knowl-

edge, which is usually only found in more experienced employees," he says.

"And in some instances, gray hair just lends some credibility," Thomas adds.

Nevertheless, to suggest that age discrimination does not exist in IS is "utter nonsense," says Debra L. Raskin, partner at Vladeck, Waldman, Elias & Engelhart, a New York law firm that specializes in labor-related issues. "Why do we see scores of qualified 50-year-olds who can't get work?" she asks.

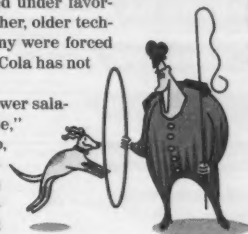
"Management is strongly educated on sexual and racial discrimination," Raskin says, "but age bias is the last vestige of the stupid." Comments regarding age and adaptability in IS are fairly common and generally tolerated.

For example, IS managers might not send an older employee to a training class if they feel that they "can't teach an old dog new tricks." They don't even think they are being discriminatory, Raskin says.

Indeed, some computer employees may be subjects of age discrimination, says Frank Cronin, a managing partner at the Los Angeles law firm of Jackson, Lewis, Schnitzler, Krupman, who has litigated more than 20 age bias cases in the computer industry. Still, he contends, most age discrimination suits are unsubstantiated and are filed because an employee doesn't understand why he was terminated.

It's easier for some employees to blame the company for age bias than to take blame for their unwillingness to learn new technologies, Cronin says.

Kay is a Tampa, Fla.-based business consultant and a free-lance writer specializing in emerging technology.



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Computer Careers

Career advice for the '90s

Always check organizational chart



Fast Track is a twice-monthly column dedicated to answering questions on career directions.

This week's guest adviser is Paul Andersen, a principal at Andersen, Jones & Muller Associates in Southfield, Mich., a recruiting firm specializing in the placement of information systems professionals.

Q: I have been presented with two opportunities at companies that have similar technical environments. I am a programmer/analyst and want to develop systems analysis skills.

Both companies claim to have career paths for me. How do I evaluate or compare these opportunities?

A: In an interview, you need to ask the right questions. In your case, the right question is: "How does this position for which I am interviewing fit into this department?"

A verbal or visual (organizational chart) description of a department screams volumes about the career prospects. If the programmer/analyst reports to a systems analyst who reports to a project leader who reports to a project manager, then the career path and training are probably available.

If the programmer/analyst reports to the manager of the department, then the career path is less certain.

Q: I recently received a bachelor's degree in computer science. I want to get into computer programming but don't have the experience most companies require. There is a position available to me as a computer operator. My thoughts are that this will get me in the door, and then I can learn programming. Do you agree?

A: No. Computer operations offers an excellent but different career path than computer programming. Unless you're looking at a small environment where you might perform multiple functions, an operator's career path is not easily transferable to a programmer's career path. It has always been tough to get that initial experience, but if you have specific career goals, stick with your search. Your patience will eventually pay off.

Q: My department manager is offering me a promotion to project manager. While I'm excited about being promoted, the technology is very old and not where our industry is headed. What do you recommend?

A: Keeping current in IS is essential. However, if the position offers you the career steps you need, other considerations become important. Let your immediate supervisors know your concern. See if you can take on additional responsibilities that would allow you to work with

state-of-the-art technology. Talk to them about starting an initial analysis toward converting the project to technology that the rest of the industry uses. Turning down a promotion is not in your best interest.

Q: I am due for a salary review soon.

My performance reviews have always been very solid, but I know that my salary is slightly less than that of my associates of equal experience and performance. How would you suggest I get myself in line with my peers in terms of compensation?

A: Start by determining who the salary decision-maker is. Talk with the person directly, avoiding negative commentary (such as "Why does so-and-so make more than me?"). Tell this person that you hope your next increase will bring you in line with others. Never mention a specific number or percentage.

Fast Track
Are you sure that you're being undervalued? Stressed out? Feeling discriminated against? We want to hear about these and other issues that affect your career. Call your questions in using the FAST TRACK LINE AT (508) 820-8522, MCI MAIL THEM TO CWCAREERS OR SEND THEM BY FAX TO KELLY SEWELL AT (508) 875-8931. IF WE USE YOUR QUESTION, WE'LL SEND YOU A GIFT.

What skills do ideal IS applicants possess?

■ The common denominator of successful IS professionals is that they're visionary, pragmatic, and they focus intensely on realistic business needs. If they get enamored with CASE tools, they forget they're trying to build something that will benefit the business.

*James M. Spitz, senior vice president and CIO
 Tri Valley Growers, San Francisco*

■ I'd look for someone who could look at a project and be able to lay out the entire process in a logical way. Also, people need to learn techniques that aren't language-specific, such as software engineering and data structures. Good writing skills are also important for writing program documentation.

*Gary Berkemeyer,
 director, application development
 TCBY Enterprises, Inc., Little Rock, Ark.*

■ Generally, the industry is headed to PC client/server-type applications, so we look for skills in application development languages and networking.

*Dave Devore, manager, systems and programming
 Florida Rock Industries, Jacksonville, Fla.*

■ I deal primarily with analysts, and when they get to this level, they need to have business experience. I recommend that they get an MBA. The further you go in IS, the more your general business skills and communication skills are required over technical skills.

*Nicholas Speranzo, director,
 Continuum Life Office Administration System
 Berkshire Life Insurance Co., Pittsfield, Mass.*

What kind of tips would you like to read about? Call your ideas in to Kelly Sewell, assistant editor, features at (508) 879-0700.

TIPS for the TIMES

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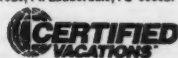
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Powersoft is seeking experts to join our consulting organization. This group is dedicated to ensuring our clients' success in developing PowerBuilder applications. Extensive experience with client/server design and development, GUI design, SQL databases and PowerBuilder is required. Applicants should enjoy working with a wide variety of clients, possess excellent communication skills and a willingness to travel extensively. Current locations: Boston, Chicago, Houston, Long Beach and San Francisco. Contact: Traci Weaver.

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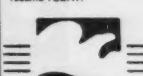
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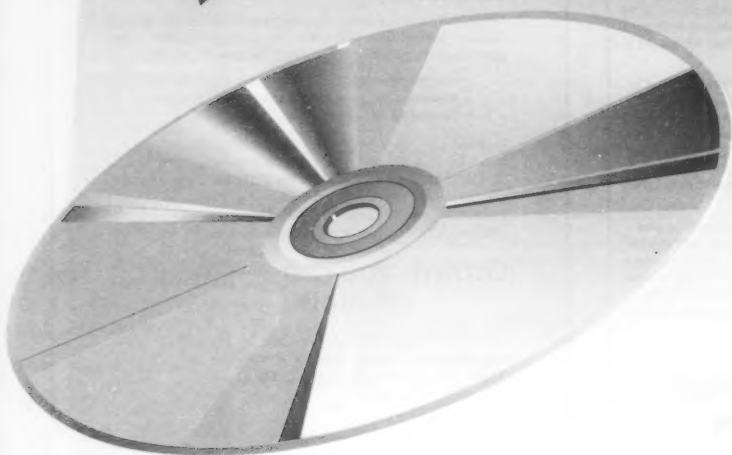
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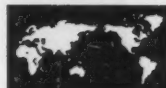
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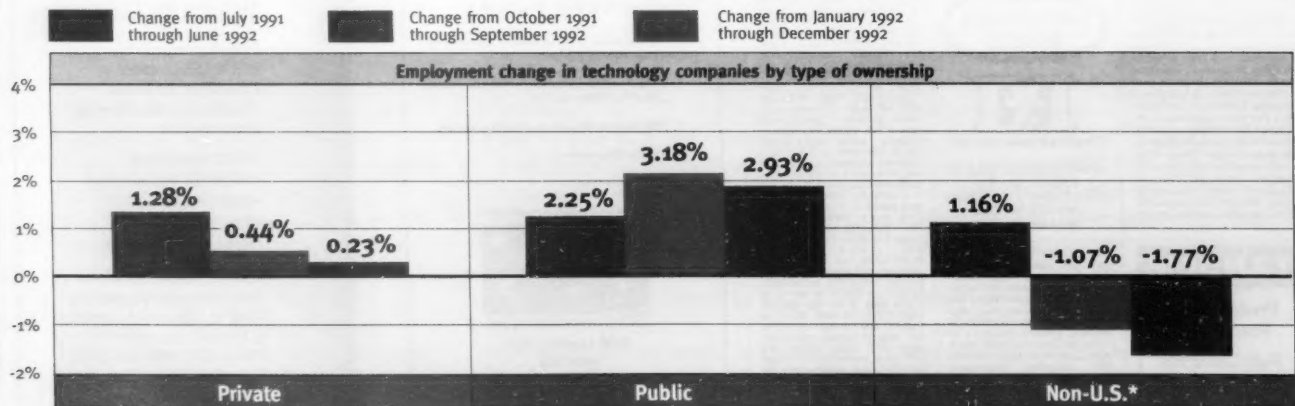
And ever since Computerworld's first weekly issue in 1967, America's companies have relied on Computerworld to target America's most qualified computer job candidates.

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Computerworld/CorpTech Career Index

Although it's slowing down, both private and public sector growth is still rising, while non-U.S. firms are stepping up their employment downsizing



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The ABCs of mail-order returns

By Alice Bredin







Anyone who has purchased a computer through the mail knows that returns are part of the experience. If you

buy often enough, a broken system or an incompatible peripheral is inevitable.

As the mail-order industry matures, return policies are becoming more sophisticated. Almost all vendors offer full money-back guarantees, but even the most progressive policies carry restrictions. Buyers planning on taking full advantage of a return need to know a variety of things.

Steps for returning products:

-  Immediately contact the mail-order company you purchased from.
-  Write a summary of your conversations with the vendor and any promises made. Ask the person you speak with to send you the same on company stationery. Mail a copy of your summary to the vendor by registered mail. "The letter is a promise of what the company will do for you," says Stephanie Brown, director of consumer affairs at the Washington, D.C.-based Electronic Industries Association.
-  Wrap up the products securely in their original packaging if possible, and send them back insured for their full purchase amount.
-  Heed return deadlines. Some vendors make allowances for late returns, but they are under no legal obligations to do so. To avoid losing money on a product, make sure that when you order items, you have time to test them. Vendors may extend the deadline if you notify them at the time of purchase that you won't be around to test the product when it arrives.

Vendor policies

Following is a sample of mail-order policies from well-known and less well-known firms. Offerings are similar in most cases but may differ in terms of shipping costs and refunds.

	CHARACTERISTICS	RETURN POLICY	RESTOCKING FEE	LEAD TIME	WHEN PRODUCT DEFECTS ARE DISCOVERED
Compaq/Idex Express Austin, Texas	30-day money-back; starts 30 days from ship date.	Customer pays.	None in first 30 days. 15% for peripherals.	7 to 10 days.	Customer pays return shipment for peripherals, otherwise vendor pays and sends replacement.
Computer Discount Warehouse Northbrook, Ill.	15-day money-back; starts on ship date.	Vendor pays.	\$95 to \$135 for cleaning and restocking of laser printers.	2 weeks.	Customer pays return shipment.
Dell Computer Corp. Austin, Texas	30-day money-back; starts when customer receives item.	Customer pays.	None.	3 to 4 days.	Vendor pays return ship- ment and sends replace- ment in 1 to 2 days.
Gateway 2000, Inc. North Sioux City, S.D.	30-day money-back; starts when customer receives item.	Customer pays.	None.	5 to 10 days.	Vendor pays return shipment.
Zoss International Ltd. Minneapolis	30-day money-back; starts on ship date.	Customer pays.	None.	Less than 1 week.	Customer pays return shipment.

Refunds

should be credited to you within one billing cycle if you paid by credit card and within seven days if you paid by check. If the mail-order company is unresponsive to your queries, a free service called **The Mail Order Action Line** will act as a liaison to rectify the situation within 30 days. Write: The Mail Order Action Line, Care of The Direct Marketing Association, 1101 17th Street, NW, Washington, D.C. 20036-4704. Send a written description of the problem, copies of canceled checks, credit-card bills and any other correspondence related to the problem.

Bredin is a free-lance writer based in New York.

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The New York City FINANCIAL INFORMATION SERVICES AGENCY has issued a formal Request for Information (RFI) as to the general availability of mainframe software which could be acquired to replace products in its current software inventory (information packages due March 18, 1993, 5:00 p.m.).

Requests for information may be obtained by calling Dorothy Duncan at (212) 206-3229.

Further details may be found within the RFI.

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NEW YORK CITY TRANSIT AUTHORITY REQUEST FOR EXPRESSIONS OF INTEREST 93RFBI1

The New York City Transit Authority ("Authority") is seeking letters of interest to identify potential bidders experienced in the "reclaim and recharge" of used ink jet cartridges for laser printers.

This work would include ink jet cartridges from nearly 750 laser jet printers produced by various manufacturers such as Apple, Hewlett Packard, Texas Instruments, Wang, and OMS.

Interested parties are requested to submit their response, including detailed information about their service, experience and qualifications. The Authority is interested in quality, delivery, and state of the art.

Said response must be received at the address below no later than April 6, 1993:

New York City Transit Authority
130 Livingston St. - Room 6022A
Brooklyn, NY 11201
Attn: R. John Popolizio/93RFBI1

Index of used computer prices

Week ending February 12, 1993

	Closing Prices	
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PS/2 Model 30 286	\$450	\$425
PS/2 Model 55SX	\$950	\$675
PS/2 Model 60	\$500	\$375
PS/2 Model P70	\$1,200	\$1,500
PS/2 Model 80	\$800	\$1,050
Compaq Portable II	\$425	\$275
Portable III	\$500	\$425
Portable 386	\$950	\$725
SLT-286	\$650	\$600
LTE-286	\$700	\$675
DeskPro 386s	\$850	\$800
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IIx	\$1,900	\$1,750
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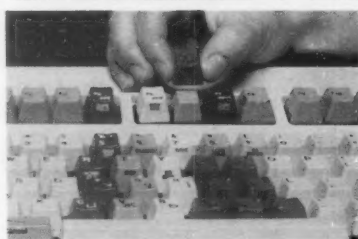
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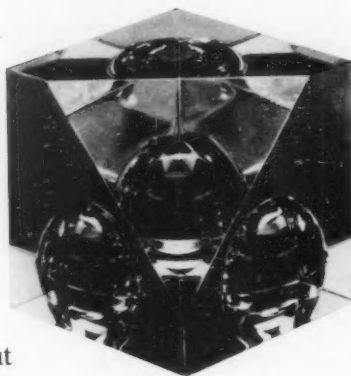
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Page number refers to page on which story begins

A		Digital Equipment Corp. 4,6,8,16,49,55,57,63,81		Library of Congress. 82		Synoptics Communications, Inc. 81	
Acceler8 Technology Corp. 49		Discover Card Services, Inc. 16		Linn-Truett, Inc. 85		Tadpole Technology, Inc. 81	
Addison-Wesley Publishing Co. 81		DMR Group, Inc. 10		Loma Linda University Medical Center 61		Texaco, Inc. 4	
ADM Consulting 12		Du Pont Co. 1,4,101		Lotus Development Corp. 8,14,100,101,102		The Aberdeen Group 57	
Adobe Systems, Inc. 81		DynaPoint, Inc. 43		M		The ASK Group, Inc. 47	
Advanced Manufacturing Research 6		E		Magic Software Enterprises 16		The Boeing Co. 4	
Advanced Network and Services 81,82		Eastman Kodak Co. 1		Maxm Systems Corp. 51		The Continuum Co. 6	
Advantis 51		Editorial, Inc. 81		Maxtor Corp. 43		The Economist 81	
Aetna Life & Casualty Co. 65		Electronic Data Systems Corp. 67		McKesson Corp. 67		The Torrington Co. 61	
Alantec Corp. 10		Elms Information Services Group 12		Mentis Corp. 67		The Village Voice 81	
Alex. Brown & Sons, Inc. 100		EMC Corp. 101		Merrill Lynch & Co. 67		The Yankee Group 10	
Allianz, AG 6		Enterprise Rent-a-Car 12		Microsoft Corp. 1,2,4,14,16,34,39,43,57,61,63,75,101		Thinking Machines, Inc. 101	
American Cancer Society 47		Ernst & Young 63		Mips Technology, Inc. 24		Travelers Insurance Co. 61	
American Express Travel Related Services Co. 1		F		Mitre Corp. 4		U	
American Society of Travel Agents 1		Farm and Home Savings Association 12		Montgomery Ryland, Inc. 61		Ungermann-Bass, Inc. 6,10,53	
Ameritech 16		Fidelity Union Life Insurance Co. 6		Montgomery Securities 100		Unisys Corp. 16	
AMR Corp. 2		FileNet Corp. 49		Motorola, Inc. 6,51		United Airlines 16	
Anasazi, Inc. 1		First National Bank, Inc. 51		N		United Technologies Corp. 101	
Andersen Consulting 67		Flexus International Corp. 61		National Computer Security Association 1		University Hospital Consortium 1	
Apple Computer, Inc. 6,43,55,63,81,101,102		Ford Motor Co. 51		Network Computing Devices, Inc. 53		University of California 82	
Applied Parallel Technologies, Inc. 101		Forrester Research, Inc. 4		Network Systems Corp. 53,55		University of Denver 67	
Applix, Inc. 53		Fourth Wave Technology, Inc. 51		New York Times 81		University of Iowa 4	
Artel, Inc. 10		Free Software Foundation 81		Next, Inc. 61		University of New Hampshire 47	
Artisoft 40		FTP Software 34		Nomadic Systems, Inc. 40		University of Richmond 67	
Associated Grocers, Inc. 4		G		North American Life and Casualty Co. 6		University of Texas 82	
Atlantic Richfield Co. 4		Gartner Group, Inc. 1,10,20,51		Norwich University 67		Unix International 61	
AT&T 1,101		General Electric Co. 81		Novell, Inc. 1,6,16,57,61,101		Unix System Laboratories, Inc. 101	
Avis, Inc. 67		General Motors Corp. 51,82		Nynex Corp. 51		Unocal Corp. 81	
B		Greenleaf Software, Inc. 20		O		U.S. Navy 20	
BCE, Inc. 101		Gupta Corp. 8		Objective Systems Integrators 51		US West NewVector Group, Inc. 53	
BMC Software, Inc. 55		H		Octus, Inc. 40		Unet Technologies 83	
Boeing Computer Services 1		Halliburton Geophysical Services 57		Open Software Foundation 4		V	
Boole & Babbage, Inc. 51		Harvard University 82		Oracle Corp. 8		Vertical Systems Group 15	
Booz Allen & Hamilton, Inc. 61		Harvard-Smithsonian Center for Astrophysics 81		Oxford University Press 51,81		Visix Software, Inc. 63	
Borland International, Inc. 61,100		Hewlett-Packard Co. 4,6,49,51,57,58,101		P		Vitalink Communications 55	
BP Oil Retail Marketing 53		High-Technology Crime Investigation Association 1		Pacific Bell 6		Vladeck, Waldman, Elias & Engelhart 85	
Break Parts, Inc. 57		Holiday Inn Worldwide 53		Parallan Computer, Inc. 1		W	
BSG Consulting, Inc. 67		Home Oil Company Ltd. 57		Parametric Technology 6		Watermark Software Corp. 40	
BT 53		Housing Authority of Baltimore 85		Pepsi-Cola International 1		Weizer Associates, Inc. 8	
Business Research Group 61		Houston Chronicle 81		Performance Systems International 83		Westinghouse Savannah River Co. 8	
Business Software Alliance 101		Hunt Oil Co. 14		Piper Aircraft 16		Wilson Windowware, Inc. 61	
Byer California 51		I		Pitney Bowes, Inc. 6		WNDC Corp. 61	
C		IBM 1,4,6,43,49,51,55,57,61,63,101,102		Positive Support Review, Inc. 1		Wollongong Group, Inc. 20	
Caltech 81		Idaho National Engineering Laboratory 1		Powersoft Corp. 8,16,63		Woodside Technologies, Inc. 49	
Canadian Airlines 2		ImageSoft, Inc. 61		Prairie Farm Mutual Insurance 85		WordPerfect Corp. 102	
Candle Corp. 12		InfoNow Corp. 14		Price Waterhouse 8		X	
Centerline Software, Inc. 61		Information Builders, Inc. 16		Primary Access, Inc. 15		X-celle-Net, Inc. 53	
Centers for Disease Control 4		Information Technology Association of America 101		Proteon, Inc. 47		Z	
CGI Systems, Inc. 62		Informix Corp. 101		Pyramid Technology Corp. 1,57		Z-Code, Inc. 53	
Charles Schwab & Co. 4		Informix Software, Inc. 1		Q		Zinc Software, Inc. 61	
Cheeseborough-Ponds USA 57		Inland Steel Co. 47		Quarterdeck Office Systems 100			
Chevron Canada Ltd. 1		Input 1		R			
Chevron Corp. 14		Institute of Electrical and Electronics Engineers, Inc. 47		Reynolds Metal Corp. 12			
Choice Hotels International 1		Intel Corp. 39,102		RSA Data Security, Inc. 48			
CIMI Corp. 53		Interex 58		S			
Citibank NA 4		International Data Corp. 20,34,47		Sailing Relaxes 65			
Clearpoint Peripheral Resources 102		International Intellectual Property Alliance 101		Salomon Brothers, Inc. 2			
Coca-Cola Co. 85		ITT Hartford Life Cos. 8		San Francisco News Agency 51			
Columbia University 81		J		Securities Industry Automation Corp. 10			
Commodore International Ltd. 100		Jackson, Lewis, Schnitzler, Krupman 85		Semaphore Communications Corp. 48			
Compaq Computer Corp. 1		James River Dixie Corp. 10		Sequent Computer Systems, Inc. 57			
CompuServe, Inc. 67		Janus Software, Inc. 58		Shell Development Co. 4			
Computer and Business Equipment Manufacturers Association 101		Japan Information Processing Development Center 67		Sherpa Corp. 6			
Computer Associates International, Inc. 6		JSB Corp. 34		Sigma Designs, Inc. 43			
Computer Intelligence/Infocorp 57		K		Silicon Graphics, Inc. 39,49,57,101			
Connecticut Mutual Alliance 57		Kalpana, Inc. 10		Smaby Group, Inc. 57			
Connective Corp. 61		KnowledgeWare, Inc. 63		Society for Information Management 2			
Convex Computer Corp. 57		L		Software Development 61			
Cray Research, Inc. 57		Lannet, Inc. 10		Sprint Corp. 15,53			
CSX Corp. 12		Lead Technologies, Inc. 61		SRI International 81			
Customer Owned Paging Group 51		Lexmark International, Inc. 43		Stac Electronics, Inc. 2			
Customer Support Consortium 39				Stanford Business Systems, Inc. 1			
D				Storage Technology Corp. 53			
Data General Corp. 57				Sun Microsystems, Inc. 8,12,49,53,57			
Dataquest, Inc. 53				SunSelect 34			
Deloitte & Touche 1,85				Sybase, Inc. 1			
Dell Computer Corp. 102				Symbologic Corp. 39,102			
Detroit Free Press 81				Synermetrics, Inc. 10			
D.H. Brown Associates, Inc. 57							
Digital Communication Association, Inc. 61							

Friday Stock Ticker

Gainers

Losers

Percent

TELEBIT CORP.	25.0	WALKER INTERACTIVE SYSTEMS (I)	-21.6
SHL SYSTEMHOUSE	21.8	PEOPLESOFT	-21.2
KOMAG INC.	16.8	EASL CORP.	-19.1
BORLAND INT'L INC.	16.2	MACFARLANE ASSOCIATES (I)	-18.5
CE SOFTWARE	14.3	NETRIX CORP. (I)	-16.5
SAPIENS USA INC.	8.1	RASTEROPS	-15.9
DATA GENERAL CORP.	7.5	EVANS & SUTHERLAND	-14.9
HEWLETT PACKARD CO.	7.4	TELEMATICS INT'L INC.	-13.5

Dollar

HEWLETT PACKARD CO.	5.13	BMC SOFTWARE INC.	-8.25
KOMAG INC.	3.13	PEOPLESOFT	-7.13
BORLAND INT'L INC.	3.00	INTELLIGENT INFO. SYSTEMS	-5.25
NEWBRIDGE NETWORKS CORP.	2.63	POLICY MANAGEMENT SYS.	-4.75
MOTOGRA INC.	2.38	LEGENT CORP.	-4.25
ACORE SYSTEMS INC.	2.00	3M CORP.	-4.00
SAPIENS USA INC.	1.63	PROGRESS SOFTWARE CORP.	-4.00
SHL SYSTEMHOUSE	1.50	MICROSOFT CORP.	-3.75

Concerns yield Sell ratings

The "Sell" rating is a rare bird among brokerage firm reports. When it does appear, however, a Sell rating does not always indicate that the stock is due for a quick drop. Instead, it may mean that a company's flagship product is not catching on or that analysts think a company is strategically off the mark in a highly competitive market.

Quarterdeck Office Systems (QDEK)

Quarterdeck was among three software companies carrying the Sell rating in a report by Montgomery Securities analysts Betty Lyter and Doug Gordon earlier this month. The other two Sell ratings went to **Borland International, Inc. (BORL)** and **Lotus Development Corp. (LOTS)**.

In Quarterdeck's case, declining sequential sales of the new **DesqView/X** software (from \$1.7 million to \$1.3 million in the December quarter) contributed to the negative forecast. Future prospects for Quarterdeck's **QEMM** software are also uncertain because **DOS 6.0** is expected to feature improved memory management, and **DOS 7.0's** anticipated 32-bit architecture could render memory management additions superfluous.

Montgomery Securities noted there is little evidence that Quarterdeck is developing new products to contribute to revenue growth. Quarterdeck hit a 52-week low of 3 1/4 in the middle of the week.

Commodore International Ltd. (CBU)

Commodore received a "Source of Funds" rating from Alex. Brown & Sons, Inc. in a Feb. 8 report, indicating that people who have funds invested in Commodore stock could find more constructive ways to use that money. (Alex. Brown does not issue a "Sell" rating.)

The company reported an operating loss of 82 cents per share for the December quarter, on revenue of \$238 million. In addition, Commodore took a \$50 million charge to cover inventory write-downs and the shutdown of manufacturing facilities overseas. According to analysts Steven Eskenazi and Janet Regalia, the key concern was faltering Amiga multimedia system sales, which dropped more than 25% from the same quarter a year ago. New Amiga A1200 and A4000 systems reached the market behind schedule and in insufficient quantities.

The Alex. Brown report recommended that investors avoid the stock until the company shows tangible evidence of reversing declining sales momentum.

Commodore issues have held at about 6 since the Alex. Brown report was released.

—Derek Slater

52-WEEK RANGE	FEB. 19 NY NET NY PCT 3PM	CHANGE	EXCH	52-WEEK RANGE	FEB. 19 NY NET NY PCT 3PM	CHANGE
COMMUNICATIONS AND NETWORK SERVICES			OFF -0.8%			
OTC 34.63 9.63	3.COM CORP.	29.63 -1.50 -4.8	OTC 14.75 7.75	INTERLEAF INC.	10.25 0.00 0.0	
NYS 75.13 36.25	AMERICAN INFO TECHS CORP. (H)	23.00 -1.11 -4.5	OTC 18.25 8.00	INTERPOLV INC.	8.75 -0.50 -5.4	
NYS 55.75 36.63	AT&T	53.50 -0.75 -1.4	OTC 19.50 5.00	KNOWLEDGEWARE INC.	10.50 -0.50 -4.5	
OTC 36.25 6.75	ARTEL COMMUNICATION CORP.	21.30 -1.19 -5.1	OTC 54.75 28.75	LEGENT CORP.	45.50 -4.25 -9.5	
OTC 24.50 10.25	BANYAN SYSTEMS INC.	18.75 -0.50 -2.6	OTC 38.75 14.75	LOTUS DEVELOPMENT	23.88 -1.38 -5.8	
NYS 54.38 40.25	BELL ATLANTIC CORP.	54.25 0.13 0.2	OTC 23.25 11.00	MACFARLANE ASSOCIATES (I)	11.00 -2.50 -18.5	
NYS 55.50 43.38	BELLSOUTH CORP.	53.75 -0.13 -0.2	OTC 8.38 1.88	MACFARLANE ASSOCIATES (I)	6.38 -0.63 -8.9	
NYS 6.75 3.63	BOLT, BERANEK & NEWMAN	4.63 -0.38 -7.5	OTC 21.50 5.25	MENTOR GRAPHICS	9.63 -0.13 -1.3	
OTC 18.50 10.00	BROOKTROUT TECHNOLOGY	15.50 0.50 -3.1	OTC 46.00 27.25	MICRO FOCUS	42.25 -1.00 -2.3	
NYS 92.25 42.13	CABLETRON SYSTEMS	77.75 -2.25 -2.8	OTC 20.50 6.50	MICROGRAPHY INC.	8.25 -1.00 -10.8	
OTC 34.50 17.75	CHIPCOM CORP.	28.38 -1.13 -3.8	OTC 95.00 65.50	MICROSOFT CORP.	80.25 -3.75 -4.5	
OTC 94.75 33.00	CISCO SYSTEMS INC.	84.50 -2.75 -3.2	OTC 36.38 12.00	ORACLE CORP.	29.75 0.00 0.0	
OTC 27.75 5.50	COMPRESSION LABS INC.	14.88 -1.13 -7.0	OTC 63.75 25.25	PARAMETRIX TECHNOLOGY	55.25 -1.00 -1.8	
OTC 3.44 0.88	DATA SWITCH CORP.	3.19 -0.06 -1.9	OTC 40.50 22.50	PEOPLESOFT	26.50 -7.13 -21.2	
NYS 22.75 13.75	DIGITAL COMM. ASSOC.	18.00 -0.75 -4.0	OTC 11.00 3.50	PHOENIX TECHNOLOGIES	5.13 -0.50 -8.9	
OTC 14.75 7.50	DIGITAL SYSTEMS INT'L INC.	7.88 -0.88 -10.0	OTC 25.00 11.25	PLATINUM TECHNOLOGY	17.25 -2.63 -13.2	
OTC 28.50 4.00	DSC COMMUNICATIONS	24.63 0.13 0.5	OTC 61.50 29.00	PROGRESS SOFTWARE CORP.	47.00 -4.00 -7.8	
OTC 10.88 4.75	FIBERLINK INT'L INC.	8.25 -0.50 -5.7	OTC 24.25 3.13	QUARTERDECK OFFICE SYS.	3.25 -0.13 -3.7	
OTC 37.63 10.50	FILNET CORP.	12.00 0.00 0.0	OTC 30.00 11.75	RAINBOW TECHNOLOGIES INC.	17.50 -1.00 -5.4	
OTC 4.38 1.50	GANDALF TECHNOLOGIES INC.	3.75 0.00 0.0	OTC 22.75 4.00	RASTEROPS	10.63 -0.75 -6.6	
OTC 2.25 0.69	GATEWAY COMMUNICATIONS	1.50 -0.13 -7.7	OTC 8.88 2.50	ROSS SYSTEMS	10.63 -0.75 -6.6	
NYS 10.50 2.88	GENERAL DATA COMM. INDOS.	8.00 -0.63 -7.2	OTC 5.75 0.75	SPINNAKER SOFTWARE	1.50 -0.13 -7.7	
ASE 4.88 2.00	GO VIDEO	2.75 -0.19 -6.4	OTC 16.50 3.25	STARS OF THE ART	11.25 -1.25 -10.0	
NYS 36.00 28.88	GTE CORP.	36.00 -0.25 -0.7	OTC 21.50 2.50	STERLING SOFTWARE INC.	7.63 -0.63 -7.6	
NYS 76.25 50.38	ITT CORP. (H)	74.38 -1.50 -2.0	OTC 25.25 8.00	STRUCT. DYNAMICS RESEARCH	12.38 -0.63 -4.8	
OTC 43.38 29.50	MCI COMMUNICATIONS CORP.	38.88 -0.88 -2.2	OTC 62.25 21.00	SYBASE INC.	52.88 -0.63 -1.2	
OTC 13.50 2.25	MICROCOM INC.	4.75 -0.13 -2.6	OTC 48.75 5.88	SYMANTEC CORP.	11.75 -0.50 -4.1	
OTC 24.25 10.13	NETRIX CORP. (I)	10.13 -2.00 -16.5	OTC 13.50 2.50	SYSTEMS CENTER INC.	8.38 -0.50 -5.6	
OTC 19.00 9.63	NETWORK COMPUTING DEVICES	16.25 -1.25 -7.1	OTC 25.50 10.00	SYSTEMS SOFTWARE ASSOC.	11.25 -0.50 -4.3	
NYS 16.63 8.13	NETWORK EQUIPMENT TECH.	9.25 -0.88 -8.6	OTC 10.38 2.50	TECHNIX CORP.	4.00 -0.25 -6.7	
OTC 23.50 8.00	NETWORK GENERAL CORP.	14.88 0.38 2.6	OTC 23.75 8.63	TECHNIX INTERACTIVE SYSTEMS (I)	8.63 -2.38 -21.6	
OTC 15.75 8.50	NETWORK SYSTEMS CORP.	11.13 -1.00 -8.2	OTC 4.38 1.38	WORDSTAR	2.31 -0.19 -7.5	
OTC 50.00 13.00	NEWBRIDGE NETWORKS CORP.	48.38 2.63 5.7				
NYS 48.75 30.50	NORTHERN TELECOM LTD.	42.88 0.25 0.6				
OTC 33.50 22.50	NOVELL INC.	27.50 0.50 -1.8				
NYS 88.50 69.13	NYNEX CORP.	87.88 0.88 1.0				
OTC 37.50 14.50	OCTEL COMMUNICATIONS CORP.	25.25 -1.75 -6.5				
OTC 9.00 3.38	PENNER DATA COMM. NETWORKS	5.00 -0.25 -4.8				
OTC 50.50 10.25	PICTURETEL CORP.	24.63 1.25 5.3				
OTC 17.50 7.00	PROTEON INC.	8.13 0.50 6.6				
NYS 30.38 10.16	SCIENTIFIC ATLANTA INC.	19.38 -2.75 -12.4				
NYS 76.63 56.63	SOUTHWESTERN BELL CORP.	72.25 -1.50 2.1				
NYS 28.25 20.75	SPRINT CORP.	27.13 -0.88 -3.1				
OTC 27.00 8.38	STANDARD MICROSYSTEMS CORP.	20.13 -0.63 -3.0				
OTC 18.50 4.88	STRATACOM INC.	16.25 0.00 0.0				
OTC 95.50 18.75	SYNOPSIS COMMUNICATIONS	75.50 -1.13 -3.9				
OTC 7.13 4.38	TELEBIT CORP.	6.63 0.13 2.0				
OTC 9.38 2.13	TELEMATICS INT'L INC.	8.00 -1.25 13.5				
OTC 25.50 13.38	US ROBOTICS	19.75 -0.75 -3.7				
NYS 41.88 32.88	US WEST INC. (H)	41.88 0.88 2.1				
OTC 46.00 12.00	WESTELL TECHNOLOGICAL CORP.	35.00 -2.75 -7.3				
OTC 22.00 7.00	XIRCOM	7.75 -0.25 -3.1				
PC'S AND WORKSTATIONS			OFF -1.3%			
OTC 8.25 3.13	ADVANCED LOGIC RESEARCH	3.63 -0.25 -6.5				
OTC 70.00 41.50	APPLE COMPUTER INC.	55.00 0.50 0.9				
OTC 24.25 11.25	AST RESEARCH INC.	18.25 -0.25 -1.4				
NYS 16.25 5.25	COMMODORE INT'L.	5.75 -0.38 -6.1				
NYS 58.50 22.25	COMPAQ COMPUTER CORP.	48.63 1.00 2.1				
OTC 49.88 15.00	DELL COMPUTER CORP.	36.88 1.25 3.5				
OTC 36.63 26.63	HARRIS CORP.	35.75 0.00 0.0				
NYS 85.00 50.25	HEWLETT PACKARD CO.	74.13 5.13 7.4				
NYS 33.00 14.13	SILICON GRAPHICS	28.38 -1.13 -3.8				
OTC 18.50 10.00	SEAGRAM SYSTEMS INC.	16.25 -0.88 -5.2				
NYS 32.13 22.25	TANDY CORP.	25.25 -2.75 -9.8				
NYS 11.13 5.00	ZENITH ELECTRONICS	7.13 -0.25 -3.4				
OTC 22.75 2.75	ZIGZAG INTERNATIONAL LTD.	5.38 0.13 2.4				
PERIPHERALS AND SUBSYSTEMS			OFF -0.4%			
OTC 28.75 10.38	AMERICAN POWER CONVERSION	23.63 -2.63 -10.0				
OTC 30.25 20.00	BANCTEC INC.	26.50 0.13 0.5				
OTC 22.00 9.25	CAMBRIDGE CORP.	11.25 -0.75 -6.3				
OTC 18.38 10.00	COMBOSID INC.	16.00 -1.25 -8.0				
OTC 19.00 16.75	CONCEPT PERIPHERALS	20.38 0.00 0.0				
OTC 38.50 10.75	CREATIVE TECHNOLOGIES INC.	28.25 -1.75 -5.8				
OTC 30.75 14.25	DATA RACE INC.	21.25 -1.63 -7.0				
OTC 19.68 4.75	DELL COMPUTER CORP.	6.00 -0.38 -6.3				
OTC 28.75 5.25	EMULX CORP.	7.23 -1.13 -4.5				
OTC 10.50 5.38	ENCLIC CORP.	7.25 0.25 3.6				
OTC 19.25 12.13	EVANS & SUTHERLAND	14.50 -1.63 -9.9				
OTC 39.75 12.00	EXAKTITE	13.63 0.00 0.0				
OTC 78.00 21.25	INTELLIGENT INFO. SYSTEMS	64.00 -5.25 -7.6				
OTC 11.13 4.38	IONEGA CORP.	11.13 0.00 0.0				
OTC 34.75 5.75	IPL SYSTEMS INC.	8.00 0.50 6.7				
OTC 23.25 10.75	ROMAGING INC.	21.75 0.13 16.8				
OTC 19.63 8.88	3M CORP.	9.00 0.38 4.0				
OTC 19.00 7.13	MICROFOLIOS CORP.	7.13 0.38 4.0				
NYS 109.75 85.50	MINITAB CORP.	103.75 -4.00 -4.0				
OTC 7.75 4.00	PHANTOMIX INC.	6.75 0.00 0.0				
OTC 19.25 12.13	QUANTUM CORP.	14.50 -1.00 -6.8				
OTC 18.00 12.13	QUINTON CORP.	15.88 0.13 0.8				
OTC 12.75 3.75	RADIOUS INC.	5.38 0.13 2.3				
OTC 19.25 6.00	REXON INC.	15.00 -0.50 -3.1				
OTC 13.88 6.00	REXON INC.	6.00 -0.25 -3.7				
OTC 22.38 12.00	SEAGATE TECHNOLOGY	17.75 0.13 0.7				
OTC 18.50 10.00	SEAGATE TECHNOLOGY	15.63 -0.63 -3.9				
NYS 25.25 16.50	TEKTRONIX INC.	23.75 0.38 1.6				
NYS 88.88 66.75	XEROX CORP.	81.88 -3.38 -4.0				
LARGE SYSTEMS			OFF -2.1%			
ASE 20.63 6.63	AMDAHL CORP.	7.75 -0.25 -3.1				
NYS 15.63 4.75	BUENAVISTA COMPUTER	11.38 -0.38 -3.3				
OTC 7.13 1.88	CRAY COMPUTER	3.63 -0.25 -6.5				
NYS 45.00 19.00	CRAY RESEARCH INC.	25.25 -0.38 -1.5				
NYS 13.00 7.13	DATA GENERAL CORP.	7.50 0.88 12.5				
NYS 65.50 30.38	DIGITAL EQUIPMENT CORP.	44.88 1.25 2.9				
NYS 100.38 45.88	IBM	50.25 -0.63 -1.2				
OTC 19.50 5.50	KENDALL SQUARE RESEARCH	15.75 -0.75 -4.5				
NYS 110.00 83.00	MATSUSHITA ELECTRONICS	90.25 1.50 1.7				
OTC 17.00 6.00	PIRAMID TECHNOLOGY	14.00 -0.50 -3.4				
OTC 24.00 11.13	SEQUENT COMPUTER SYS.	20.75 -0.50 -2.4				
OTC 16.38 1.38	SEQUOIA SYSTEMS INC.	16.38 0.00 0.0				
NYS 54.00 29.50	STRATUS COMPUTER INC.	32.50 -0.75 -2.3				
NYS 16.88 9.88	TANDY COMMUNICATIONS INC.	12.38 -1.00 -7.5				
NYS 13.25 7.75	TELETYPE UNIT	11.75 -1.13 -9.3				
ASE 7.50 0.06	WANG LABS INC. (H)	0.88 -0.06 -6.7				
SOFTWARE			OFF -0.9%			
OTC 59.25 25.25	ACORE SYSTEMS INC.	43.00 2.00 4.9				
OTC 32.50 10.25	ALUCOR CORP.	17.50 0.25 1.4				
OTC 19.75 7.00	AMERICAN SOFTWARE INC.	15.75 -0.50 -3.2				
OTC 25.63 9.75	ASAC COMPUTER SYSTEMS	22.88 -2.00 -8.0				
OTC 56.50 24.88	AUTODIN INC.	46.50 0.75 1.6				
OTC 32.75 3.50	BACHMAN INFO. SYSTEMS	4.25 0.00 0.0				
OTC 43.00 34.00	BGS SYSTEMS INC.	41.00 1.25 3.1				
OTC 84.13 37.25	BMC SOFTWARE INC.	60.00 -8.25 -12.1				
OTC 28.25 17.00	BOOLE & BARBAGE	26.50 0.50 1.9				
OTC 75.25 17.50	BORLAND INT'L INC.	21.50 3.00 16.2				
OTC 9.50 3.00	CE SOFTWARE	4.00 0.50 14.3				
ASE 35.00 9.38	CHEVENSE SOFTWARE INC.	26.38 -1.50 -5.4				
OTC 19.50 8.25	CHIPSORT	15.50 -0.75 -4.6				
OTC 11.88 5.63	COGNOS INC.	9.88 -0.50 -4.8				
NYS 27.38 10.88	COMPUTER ASSOCIATES	24.50 -0.13 -0.5				
NYS 12.38 4.00	COMPUTERVISION CORP.	4.75 -0.38 -7.3				
OTC 18.50 6.75	COMSHARE INC.	8.88 -0.13 -1.4				
OTC 17.25 10.75	COREL CORP.	11.63 -0.25 -2.1				
OTC 44.00 6.00	EASEL CORP.	9.50 -2.25 -19.1				
OTC 25.50 11.75	FRANK TECHNOLOGY	13.80 -1.75 -11.9				
OTC 22.25 12.50	GROUP I SOFTWARE	15.00 -2.00 -11.8				
OTC 8.75 3.50	HOGAN SYSTEMS INC.	7.38 -1.00 -11.9				
OTC 25.75 12.25	IMBS (I)	12.75 -1.88 -13.3				
OTC 34.75 18.50	INFORMATION RESOURCES	31.13 0.63 2.0				
OTC 42.00 12.13	INFORMIX CORP.	31.50 -2.25 -6.8				
OTC 21.25 11.00	INTERGRAPH CORP.	12.50 0.50 4.2				
SERVICES			OFF -0.5%			
OTC 23.50 12.16	AMERICAN MGMT. SYSTEMS	18.38 -2.50 -12.0				
NYS 5.38 3.00	ANACOMP INC.	3.50 -0.13 -3.4				
NYS 35.75 16.00	ANALYSIS INT'L	31.50 -1.00 -3.1				
NYS 55.88 38.75	AUTO DATA PROCESSING	55.25 0.38 0.7				
NYS 17.25 8.97	CERIDIAN CORP.	15.00 0.38 2.6				
NYS 19.16 12.50	COMBOSID INC.	15.13 0.38 2.5				
OTC 13.00 6.75	COMPUTER HORIZONS	10.00 -1.25 -11.1				
OTC 84.00 57.00	COMPUTER SCIENCES	74.75 -2.63 -3.4				
OTC 10.13 7.13	COMPUTER TASK GROUP	7.50 -0.13 -1.6				
OTC 37.50 22.00	COMPUSEARCH INC.	28.00 -1.88 -6.3				
OTC 19.25 6.00	CORPORATE SOFTWARE	11.50 -0.50 -4.2				
OTC 30.75 7.75	EGGHARD DISCOUNT SOFTWARE	8.63 -0.25 -2.8				
NYS 35.88 25.25	GENERAL MOTORS E (EES)	29.75 -1.00 -3.3				
OTC 25.50 9.25	INACOM CORP. (H)	20.75 -2.00 -8.1				
OTC 30.38 6.25	INTELLIGENT ELECTRONICS	13.88 -0.38 -2.6				
OTC 14.88 6.00	PERKINS MANAGEMENT SYS.	11.88 -0.88 -7.5				
OTC 15.75 5.75	MICROAGE INC.	12.00 -0.50 -4.2				
OTC 30.00 16.66	PAYCHEX	36.00 0.50 1.4				
OTC 83.25 21.50	RAYMOND CORP.	74.75 -1.25 -1.7				
OTC 42.75 21.81	REYNOLDS AND REYNOLDS	29.50 -1.13 -3.7				
OTC 32.00 22.00	SEI CORP.	28.50 -1.13 -3.9				
OTC 16.00 7.13	SHARPE MEDICAL SYSTEMS	13.88 -0.38 -2.6				
OTC 14.88 6.00	SHL SYSTEMHOUSE	8.38 1.50 17.8				
OTC 29.25 18.25	SOFTWARE SPECTRUM INC.	23.50 0.50 2.1				
OTC 30.00 14.50	STAR SYSTEMS (H)	30.13 -1.38 -4.6				
OTC 3.63 1.13	ULTIMATE CORP.	1.88 0.13 6.8				

Computer Industry

In Brief

HP Q1 revenue up

Fueled by strong growth in nonimpact printers, Unix systems and telecommunications test equipment, Hewlett-Packard Co. last week reported fiscal first-quarter revenue of \$4.6 billion, up 18% from the same period last year. Net earnings for the period ended Jan. 31 were \$261 million, compared with a loss of \$30,000 a year earlier. The red ink followed accounting changes that caused a one-time writedown of \$332 million.

EMC profits take off

Hopkinton, Mass., storage systems vendor EMC Corp. posted fourth-quarter profits of \$10.1 million, up 52% from the comparable period last year. Revenue was \$109.1 million, up 42% from the year-earlier quarter. For the year, EMC earned \$28.7 million on sales of \$349.1 million, up 120% and 50%, respectively.

SHL gets equity lift

New York investment house E. M. Warburg, Pincus & Co. has agreed to buy 4.5 million shares of SHL Systemhouse, Inc. The deal, valued at \$32 million, comes weeks after minority investor, BCE, Inc., found a buyer for its 22% stake in the Ottawa-based systems integrator [CW, Jan. 25].

SHORT TAKES Novell, Inc. has signed a definitive agreement to acquire Unix System Laboratories, Inc. from AT&T in a stock deal valued at \$323 million. The deal still needs shareholder and regulatory approval. . . . Informix Corp. has reached an agreement in principle to settle securities class-action suits filed against it and some of its officers and directors in 1988. The Menlo Park, Calif., software developer will provide \$8.4 million, and its liability insurance carrier will give \$2 million to a settlement fund.

S. Korea, Spain cited as software pirates

By Gary H. Anthes
WASHINGTON, D.C.

■ A coalition of trade groups representing U.S. producers of software and other copyrightable items last week asked U.S. Trade Representative Mickey Kantor to take trade actions against South Korea and Spain for flagrant violation of copyright laws.

The International Intellectual Property Alliance (IIPA) — which includes the Information Technology Association of America, the Business Software Alliance, the Computer and Business Equipment Manufacturers Association and five other groups — asked Kantor to put South Korea on the government's list of "Priority Foreign Countries." Countries on that list are subject to the most intense pressure to end widespread piracy of software, films, books and sound recordings.

Roughly 88% of all software used in South Korea is pirated, according to Robert Holleyman, president of the Business Software Alliance, which represents firms such as Apple Computer, Inc., Lotus Development Corp., Novell, Inc. and Microsoft Corp. "Korea has grossly deficient software protection law and inadequate enforcement," he said.

For example, Holleyman said, Korean law

does not provide for raids on organizations suspected of using pirated software. South Korea's response to U.S. complaints so far has been mostly "window dressing" aimed at getting the U.S. to back off, he added.

Unchecked piracy represents the single largest trade barrier for U.S. software publishers, which hold roughly 75% of worldwide market share, Holleyman explained.

The IIPA asked that Spain be added to the lower priority "Watch List," which means the government will increase scrutiny of the country's copyright protection regimen. The organization cited 26 other countries for inadequate copyright protection under the Special 301 provisions of the U.S. Trade Act of 1974.

The IIPA estimated U.S. software firms lost out on \$2.18 billion worth of trade last year, up from \$1.95 billion in 1991 (see chart). The IIPA also said it will file a petition seeking removal of Cyprus, Egypt, El Salvador, the Philippines, Poland, Thailand and Venezuela as beneficiaries of duty-free trading privileges with the U.S. unless they beef up copyright protections.

Kantor has until April 30 to identify countries as Priority Foreign Countries — those deemed the worst offenders — under Special 301. After a six-month period of negotiations, if the practices have not ended, the U.S. may take retaliatory trade action against those countries.

Walking the plank

The flagrant violation of copyright laws cost the industry an estimated \$2.18 billion in 1992

WORLDWIDE WORST OFFENDERS	
Estimated 1992 U.S. trade losses (in millions)	
Taiwan	\$585
S. Korea	\$315
Italy	\$238
Poland	\$100
Thailand	\$49
Philippines	\$25
Turkey	NA*

PRIORITY WATCH LIST	
People's Republic of China	\$225
India	\$63
Brazil	\$40
Venezuela	\$40
Saudi Arabia	\$28
Egypt	\$14
Australia, Greece, Cyprus, El Salvador	NA*

WATCH LIST	
Spain	\$336
Russia	\$100
Bulgaria	\$20
Paraguay, United Arab Emirates, Indonesia, Malaysia, Pakistan, Hungary, Israel, Guatemala	NA*

*Not available

Source: International Intellectual Property Alliance

Wavetracer forced to close doors

Slow supercomputer sales, lack of funding sealed company's fate

By Maryfran Johnson
ACTON, MASS.

Beset by inadequate financial backing and inexorable market trends, supercomputing vendor Wavetracer, Inc. recently joined the industry's casualty list of failed companies.

"We made attempts to market our hardware and software technology but were not successful in finding buyers within a reasonable time period," said Thomas Pickett, company president and last remaining employee. Wavetracer closed on Jan. 31, four months after its investors declined to supply further funding.

Wavetracer sold only 20 of its deskside Zephyr supercomputer systems in the past two years to companies such as United Technologies Corp.'s Sikorsky Aircraft Division and Du Pont Co. But the difficulties of programming and developing software for parallel computers limited Zephyr's ap-

peal, Pickett said. The hardware itself was highly regarded, however, as one of the first supercomputer-class systems to be affordably priced (see box) while delivering speeds of more than 700 million instructions per second.

Big boys move in

Another fatal blow was the rise of standards-based technologies for building supercomputers, as companies such as IBM, Hewlett-Packard Co., Thinking Machines, Inc. and Silicon Graphics, Inc. began targeting the low end of the supercomputer market with systems based on reduced instruction set computing (RISC) processors (see story page 57).

"The parallel computing world is moving away from systems built on proprietary processors and moving to those built on RISC," said Robert Utzschneider, former vice president of marketing at Wavetracer. "It's pretty difficult for a small start-up to compete ef-

fectively if you have to develop your own processor and compiler technology."

Utzschneider and other Wavetracer employees have now established a spin-off software and systems integration company called Applied Parallel Technologies, Inc. in Cambridge, Mass. "There is a significant need for software to take advantage of parallel processors," said Utzschneider, president of the new firm.

Wavetracer's remaining users have not been abandoned completely, however. Customer service and support will be provided on a contract basis for the next 12 months, Pickett said.

"We still love the machine," said David Pensak, corporate adviser for computer technology at Du Pont in Wilmington, Del., which uses a Zephyr system for molecular modeling. "We found them to be extremely professional and very innovative in what they tried to do. We'll keep using it until it dies."

Wavetracer, Inc. Acton, Mass.

Opened: July 1988.
Closed: January 1993.

Funding: \$11 million in venture capital.

Employees: 45.

Product: Wavetracer Zephyr, a deskside massively parallel computer in two models, priced at \$85,000 and \$150,000. Shipping since fall 1990.

Best use: Analyzing and visualizing large-scale, three-dimensional problems.

Key target markets: Government research agencies; aerospace and defense contractors; chemical companies.

Systems sold: 20.

Industry Pulse

PC software

Top 5 worldwide software application vendors (revenue in millions)

Microsoft Corp.	Lotus Development Corp.	WordPerfect Corp.	Borland International, Inc.	Symantec Corp.
1992	1992	1992	1992	1992
\$3,200.0	\$894.7	\$643.7	\$493.9	\$206.8
1991	1991	1991	1991	1991
\$3,200.0	\$776.9	\$451.6	\$471.1	\$123.5
Percent growth	Percent growth	Percent growth	Percent growth	Percent growth
99.5%	15.2%	42.5%	4.8%	67.4%

Source: Dataquest, Inc.

Industry sales (in millions)

1992	\$6,619.4
1991	\$5,089.2
1990	\$3,713.3
1989	\$2,743
1988	\$2,281.6

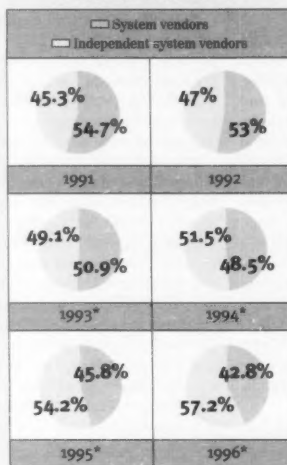
Source: Gartner Group, Inc. Yardstick

Legislation watch

Congress passed S.893, which elevates software piracy from a misdemeanor to a felony. Prison terms of up to five years and fines of up to \$250,000 can now be imposed on people convicted of making at least 10 copies of a copyrighted program for financial gain.

*Projected

Percent of market



Source: Forrester Research, Inc.

The Fifth Wave by Rich Tennant



"THE SHORT ANSWER TO YOUR REQUEST FOR A RAISE IS 'NO.' THE LONG ANSWER IS 'NO, AND GET OUT OF MY OFFICE.'"

Inside Lines

All along the watchtower

Dell Computer could soon find itself on Gartner Group's "Problem Watch," a report that lists vendors experiencing significant difficulties, according to sources close to the Stamford, Conn., consultancy. Dell is being cited for BIOS problems with its new P and L systems series and quality problems with its notebook line. Gartner Group is currently reviewing Dell's responses to its initial report. A final draft is due by month's end. If added, Dell won't be alone on this list: The IBM PC Co. is already there because of its parent's financial difficulties.

What's good for the goose...

A WordPerfect spokeswoman said last week that Novell is actively courting PC software vendors to combat Microsoft's dominance of the desktop by drumming up interest in bundling software packages with DR DOS and NetWare Lite. She declined to discuss the details of "informal discussions," and a spokesman at Lotus would neither confirm nor deny that the company was having similar discussions with Novell.

Going au naturel

In its continued bid to boost "natural" data types such as full-motion video and audio, Intel last week said it will offer 20 products in 1993 devoted to compression, acceleration and image capture. It will also introduce products that will advance wireless communications for mobile computers and push ISDN for the PC. "We think we're on the verge of an evolution in PCs as significant as the PC was to the replacement of the typewriter and the calculator," said Pat Gelsinger, an Intel vice president.

Big Blue ripple

IBM's massive downsizing efforts are beginning to have a ripple effect on businesses that ride Big Blue's coattails. K/W Control Systems in Slate Hill, N.Y., which sells backup power supplies to IBM and its mainframe customers, announced plans last week to lay off roughly 25% of its work force. K/W executives cited IBM's 12% drop in mainframe sales last year and anticipated double-digit mainframe sales declines this year as the primary reason for the layoffs. K/W, which employs 230 people, is planning to eliminate up to 55 positions.

Clouded picture

Clearpoint Peripheral Resources, a memory and disk drive manufacturer in Hopkinton, Mass., has laid off 105 people in the past month, a spokesman confirmed last week. Total employment is now about 80 vs. a peak of about 300 employees worldwide a few years back. The vendor is continuing to sell its major product lines, the spokesman added, although it will outsource the manufacturing of some of its memory modules.

Windows For Wargroups?

"Windows everywhere," says Microsoft Chairman Bill Gates — but we had no idea that his vision included the U.S. Army's ultra-sophisticated M1 tank. Windows was the platform used by Symbolic Corp. for the Turbine Engine Diagnostics (TED) program it developed for the M1 using its expert systems tool, Symbolic Adept for Windows. Granted, TED will be used behind the lines like an intelligent repair manual, but the day seems to be drawing near when Windows could act as an interface to the tank's on-board computer.

Did you see who was seated next to Hillary Rodham Clinton during President Bill Clinton's State of the Union address last week? None other than Apple CEO John Sculley. Seems that Sculley, a lifelong Republican who endorsed the former Arkansas governor during the campaign, has come to personify Clinton's interest in high tech. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld's 24-hour voice-mail tip line at (508) 820-8555.

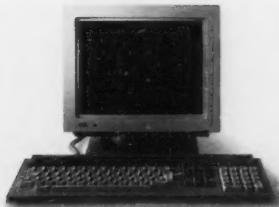
The complex steps you must follow to add Wyse terminals to your DEC environment.



1. Plug.
2. Play.



WY-285. VT420 compatible.



WY-185. VT320 compatible.



WY-370. Color VT320 compatible.



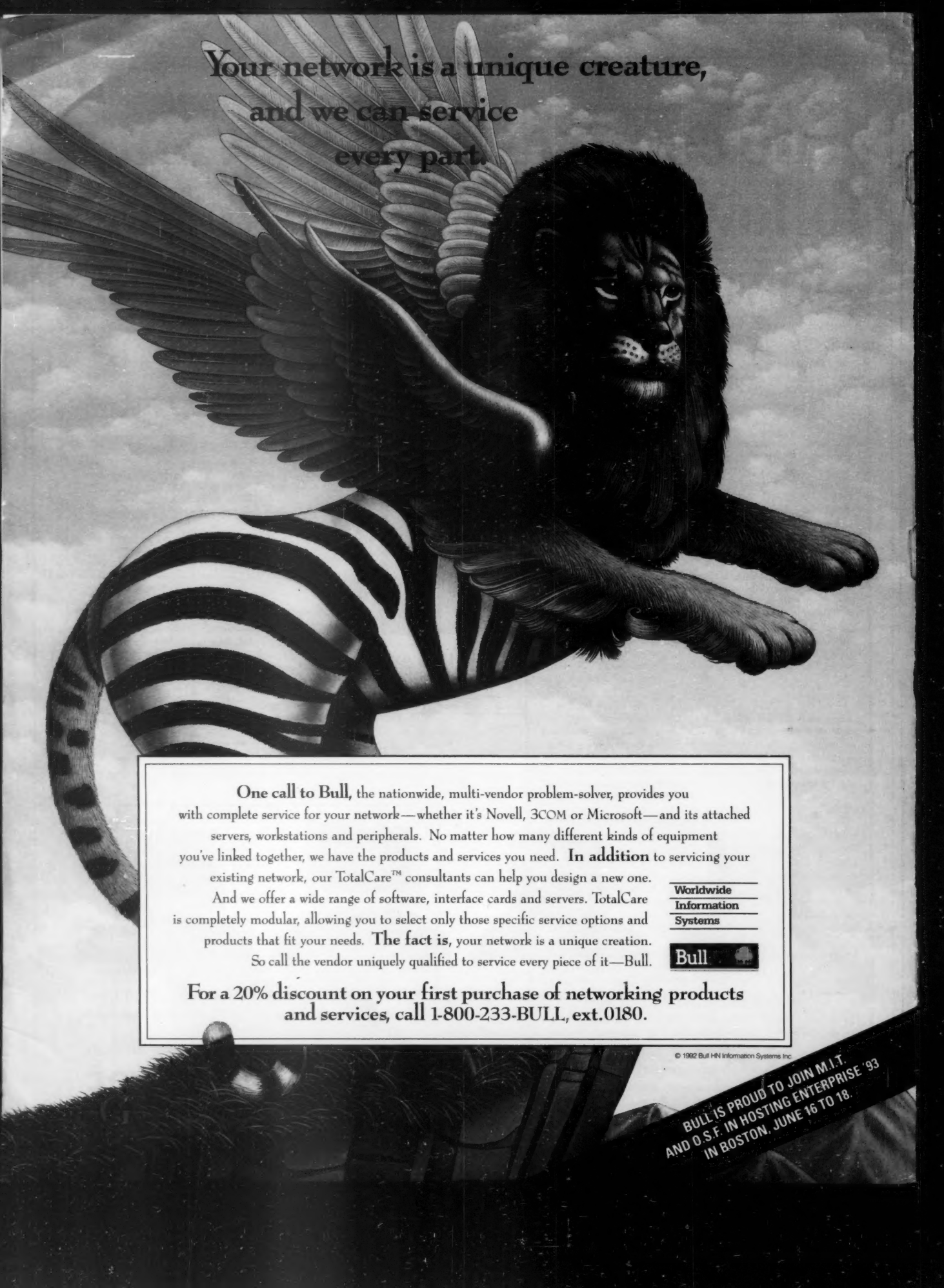
WY-325. Color VT220 compatible.

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